









GUIDE

TO THE GENERA AND CLASSIFICATION

OF THE

NORTH AMERICAN ORTHOPTERA

FOUND NORTH OF MEXICO

BY

SAMUEL HUBBARD SCUDDER



CAMBRIDGE  
EDWARD W. WHEELER  
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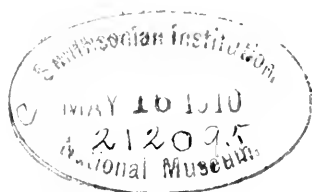
THE poetry of earth is never dead:

When all the birds are faint with the hot sun,  
And hide in cooling trees, a voice will run  
From hedge to hedge about the new-mown mead;  
That is the Grasshopper's — he takes the lead  
In summer luxury, — he has never done  
With his delights; for when tired out with fun  
He rests at ease beneath some pleasant weed.

The poetry of earth is ceasing never:

On a lone winter evening, when the frost  
Has wrought a silence, from the stove there shrills  
The Cricket's song, in warmth increasing ever,  
And seems to one in drowsiness half lost,  
The Grasshopper's among some grassy hills.

KEATS.



## PREFACE.

THE following Tables and Bibliographies are published, not as a finality, but for temporary use by students of Orthoptera in this country, who have few means for working up their collections. The author contemplates a general work on the classification of our Orthoptera, of which this is merely a Prodromus and which may serve its purpose until the material at hand has been more thoroughly studied. The frequent demands made for information have prompted it. The greater number of the tables are based upon those of Stål, Brunner and de Saussure, but these authors are in no way responsible for the form in which they here appear.

A great deal of work has yet to be done, especially in the Saltatorial families, before even the genera of our fauna are fairly known. What is given below includes only data already published or about to be published. Nearly two hundred genera are included in the tables.

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# GUIDE TO THE GENERA AND CLASSIFICATION OF NORTH AMERICAN ORTHOPTERA.

ALL the seven families of Orthoptera are found in the United States, but only the saltatorial families in any considerable variety, unless we may except the Blattidae. In the subfamilies however the case is different, for less than half of them occur within our boundaries at all and a number that do occur are represented only by a single (often introduced) species. The following list will show the proportion that occur in the different families.

|              |               |                    |   |             |
|--------------|---------------|--------------------|---|-------------|
| Forticulidae | 1 subfamily   | represented out of | 1 | recognized. |
| Blattidae    | 6 subfamilies | "                  | " | 11 "        |
| Mantidae     | 2             | "                  | " | 6 "         |
| Phasmidae    | 3             | "                  | " | 12 "        |
| Acridiidae   | 4             | "                  | " | 9 "         |
| Locustidae   | 6             | "                  | " | 15 "        |
| Gryllidae    | 6             | "                  | " | 6 "         |
|              | —             |                    |   | — "         |
|              | 28            | "                  | " | 60 "        |

It will be seen that even in the saltatorial families scarcely more than half of the subfamilies occur, notwithstanding that all the subfamilies of Gryllidae have representatives. The representation is shown also to be very unequally distributed.

The families of Orthoptera may be distinguished by the table given on the next three pages.

*Families of Orthoptera.*

*A*<sup>1</sup>. Non-saltatorial and mute. Hind femora closely resembling those of the other legs, and scarcely if at all stouter or longer than the middle femora; organs of flight in a normal position when immature; ovipositor concealed by the subgenital plate.

*b*<sup>1</sup>. Mouth anterior; tarsi with not more than three joints; anal area of wings (when present) extending around the apex over more than half the front border of the wings; abdomen terminated in both sexes by forcipate appendages. **FORFICULIDAE.**

*b*<sup>2</sup>. Mouth posterior, inferior, or at most antero-inferior; tarsi five-jointed\*; anal area of the wing never infringing on the front border; abdominal appendages not distinctly forcipate.

*c*<sup>1</sup>. Body oval, depressed, much broader than deep at the posterior extremity of the prothorax; head nearly horizontal and wholly or almost wholly concealed beneath the pronotum, the mouth posterior or infero-posterior when at rest; ocelli generally two in number; pronotum clypeate, generally transverse; legs depressed. Insects of rapid movement.

**BLATTIDAE.**

*c*<sup>2</sup>. Body elongate, generally narrow, even when depressed or expanded generally but little broader than deep at the posterior extremity of the prothorax; head free, often separated from the prothorax by a deep constriction; ocelli three or wanting; pronotum never transverse, except occasionally by laminate expansions; legs rarely depressed. Insects of deliberative movement.

*d*<sup>1</sup>. Head oblique, generally trigonal; mouth inferior or infero-posterior; ocelli three; antennae rarely as long as the body, generally slender; pronotum generally longer than any other segment; fore-legs raptorial, terminating in a single claw, which with the tarsi is placed beneath the spinous tibiae when at rest; anal cerci articulated.

**MANTIDAE.**

\* Occasionally a joint is absent, probably by accidental loss of the leg in early life, since in the reproduction of lost limbs one tarsal joint always disappears.

*d*<sup>2</sup>. Head subhorizontal, generally quadrate or gibbous; mouth antero-inferior; ocelli often wanting; antennae generally longer than the body and coarse; pronotum very short; fore-legs constructed like the others, terminating in a pair of claws, the fore femora often arcuate at the base; anal cerci inarticulate. . . . PHASMIDAE.

*A*<sup>2</sup>. Saltatorial and generally stridulating. Hind femora very much stouter basally, or very much longer, or both, than the middle femora; organs of flight in a reversed position when immature; head vertical; ovipositor, with few exceptions, free.

*b*<sup>1</sup>. Antennae much shorter than the body (with few exceptions), filiform, clubbed or ensiform, but if the first scarcely tapering, the joints distinct, often depressed; ocelli three; tarsi three-jointed, similar in structure on all the legs; stridulating organs (when present) situated on the hind femora and costal field of the tegmina; auditory organs (when present) on the basal segment of the abdomen; ovipositor composed of a discrete double pair of short areolate plates, vertically divergent at tip. . . . ACRIDIDAE.

*b*<sup>2</sup>. Antennae much longer than the body, setaceous, delicately tapering; ocelli often wanting; tarsi three- or four-jointed; stridulating organs (when present) situated on the anal field of the tegmina; the auditory near the base of the fore tibiae (or rarely on the prosternum); ovipositor usually prolonged into a compressed blade or needle, its parts compact.

*c*<sup>1</sup>. Ocelli generally wanting; tarsi four-jointed, nearly similar in structure on all the legs\*; fore coxae usually broader than long†; middle field of tegmina in repose, like the costal field, nearly or quite vertical; base of male tegmina (when present) furnished on dorsal surface with a tympanum limited to the anal area, crossed by a prominent nervure formed by the last branch of the anal vein, and as a whole narrower than the rest of the tegmen; ovipositor (unless, as rarely, concealed) forming a strongly compressed, generally ensiform blade, the inner valves almost always partially exposed the entire length of the ovipositor, the tip not expanded. LOCUSTIDAE.

\* In *Dalmanina* the fore and hind tarsi are three-jointed.

† Excepting in *Stenopelmatinae* and *Gryllacrinae*.

c<sup>2</sup>. Ocelli variable; tarsi three-jointed, those of the fore legs or else of the hind legs differing from the others in structure; fore coxae longer than broad; middle field of tegmina in repose, like the anal field, nearly or quite horizontal\*; base of male tegmina (when present) furnished on the dorsal surface with a tympanum (rarely absent) extending across both anal and median areas, crossed by a prominent nervure formed by the main anal vein, and as a whole broader than the rest of the tegmen (except in Grylotalpinae); ovipositor (unless, as rarely, concealed) forming a nearly cylindrical straight or occasionally upcurved needle, the inner valves generally scarcely exposed except at the expanded tip.

GRYLLIDAE.

\*The Asiatic *Schizodactylus* is a curious example of a Locustid, with an enormously developed and horizontal anal field, giving it the aspect of a Gryllid.

## FORFICULIDAE.

This family has never been divided by systematists save into genera, of which half a dozen occur in the United States, and may be separated by the subjoined table. Somewhat more than thirty genera are now recognized in the whole world. None of our genera are restricted to our territory.

*Genera of Forficulidae.*

*A*<sup>1</sup>. Sixth antennal joint much shorter than the first.

*b*<sup>1</sup>. First antennal joint as long as the fourth to sixth joints inclusive.

*c*<sup>1</sup>. Furnished with both tegmina and wings.

*Labidura* Leach.

*c*<sup>2</sup>. Possessed of neither tegmina nor wings.

*Anisolabis* Fieber.

*b*<sup>2</sup>. First antennal joint no longer than the fourth and fifth joints together. . . . . *Spongophora* Serville.

*A*<sup>2</sup>. Sixth antennal joint as long or very nearly as long as the first.

*b*<sup>1</sup>. Sixth antennal joint cylindrical, many times longer than broad; second tarsal joint produced beneath the first.

*c*<sup>1</sup>. Forks of the male forceps dilate at base, contiguous.

*Forficula* Linné.

*c*<sup>2</sup>. Forks of male forceps not dilate at base, separate.

*Sphingolabis* Bormans.

*b*<sup>2</sup>. Sixth antennal joint plainly oboeonic; second tarsal joint simple, compressed. . . . . *Labia* Leach.

The first two genera are represented by single cosmopolitan species, introduced along the Atlantic coast. *Spongophora* is also known only by a single species, found in the Southern States and southward. The other genera are better represented, especially *Forficula*, but most of the species are confined to the extreme south. Hardly more than a dozen species of the family occur anywhere in the United States.

## BLATTIDAE.

Only about half the subfamilies of Blattidae occur in North America north of Mexico, and half of those that do occur are represented only by one or two commercially introduced species. A single subfamily is fairly well represented by indigenous species, and of all the genera only one is confined to the United States. Many of the genera occur in both the Old and New Worlds.

*Subfamilies of Blattidae.*

*A*<sup>1</sup>. All the femora, or at least the middle and hind pair spined beneath.

*b*<sup>1</sup>. Last ventral segment of female abdomen relatively plane, not compressed-rostrate, entire, not fissate; fore femora rarely armed beneath on the inner margin with many distinct spines next the genicular spines, and if so then the styles are unequal or one is wanting.

*c*<sup>1</sup>. Pronotum and tegmina glabrous; tarsi without pulvilli; median vein of wings sending but few veinlets to the apex, the radial many parallel, generally simple veinlets to the costal margin. . . . . *Blattinae*.

*c*<sup>2</sup>. Pronotum and tegmina more or less pilose; tarsi provided with pulvilli; median vein of wings with many branches, the radial emitting relatively few and more or less irregular veinlets to the costal margin. . . . . *Nyctoborinae*.

*b*<sup>2</sup>. Last ventral segment of female abdomen compressed-rostrate, fissate so as to be bivalved; fore femora armed beneath with many spines on the inner margin, throughout nearly or quite the whole length or at least in the middle; styles of equal length. . . . . *Periplanetinae*.

*A*<sup>2</sup>. The middle and hind femora, and usually all the femora, without spines beneath.\*

*b*<sup>1</sup>. The supraanal plate more or less produced in both sexes, its hind border emarginate.

*c*<sup>1</sup>. A distinct arolium between the claws; pronotum and tegmina glabrous; anal field of wings multiply when at rest. . . . . *Panchlorinae*.

\* Bristles or hairs must not be mistaken for spines.



- $c^2$ . No arolium between the claws'; pronotum and tegmina more or less pilose; anal field of wings uniplicate when at rest, or simply folded without plication beneath the anterior field. . . . . *Corydinae*.
- $b^2$ . The supraanal plate short or rather short, the hind margin straight or rounded, not emarginate.
- $c^1$ . A distinct arolium between the claws; subgenital plate of male more or less produced, furnished with one style; tegmina and wings present. . . . . *Plectopterinae*.
- $c^2$ . No arolium between the claws; subgenital plate of male minute, without styles; apterous. . . . . *Panesthinae*.

## BLATTINAE.

Only half a dozen genera of this subfamily have been recognized in the United States, although this is nearly half as many as are known from Mexico and Central America and is a larger number than appertain to any other of our subfamilies of Blattidae, and the genera are represented by more species than in any other subfamily.

*Genera of Blattinae.*

- $a^1$ . Tegmina completely developed, or in the female rarely abbreviate.
- $b^1$ . Tegmina membranaceous or slightly coriaceous.
- $c^1$ . Antennae basally incrassate, densely but briefly pilose, often particolored. . . . . *Thyrsocera* Burmeister.
- $c^2$ . Antennae setaceous, sparsely pilose, unicolorous.
- $d^1$ . Ulnar vein of wings emitting complete branches to the apical margin and incomplete branches to the vena dividers. . . . . *Ischnoptera* Burmeister.
- $d^2$ . Ulnar vein of wings emitting no incomplete branches to the vena dividers.
- $e^1$ . Ulnar vein of wings undivided or furcate.  
*Blatta* Linné.
- $e^2$ . Ulnar vein of wings ramose.  
*Phyllodromia* Serville.

*b*<sup>2</sup>. Tegmina corneous. . . . *Ceratinoptera* Brunner.  
*a*<sup>2</sup>. Tegmina in both sexes abbreviate, corneous, exposing a portion (generally a great portion) of the abdomen.

*b*<sup>1</sup>. Tegmina articulate; wings present though minute.

*Temnopteryx* Brunner.

*b*<sup>2</sup>. Tegmina squamiform, lateral, not articulate; wings wanting.

*Loboptera* Brunner.

All of these genera are found in the southern portion of the United States, and only *Ischnoptera*, *Blatta* (introduced) and *Temnopteryx* in the northernmost portions of the country. *Thyrsocera*, *Blatta*, *Ceratinoptera* and *Loboptera* only occur in single species, so far as is yet known. *Ischnoptera* (*Platamodes* Scudder) is the most prolific in forms. A careful study of our native *Blattinae* is much to be desired.

#### NYCTOBORINAE.

Represented by only a single species of *Nyctobora* Burmeister found in southernmost Texas.

#### PERIPLANETINAE.

Four genera of this subfamily occur in the United States, only one other genus occurring in North America south of our boundaries.

##### *Genera of Periplanetinae.*

*a*<sup>1</sup>. First joint of hind tarsi shorter than the others together; arolia rather large.

*b*<sup>1</sup>. Tegmina abbreviate and apically truncate, or wanting.

*Eurycotis* Stål.

*b*<sup>2</sup>. Tegmina as long as but not surpassing the body.

*Pelmatosilpha* Dohrn.

*a*<sup>2</sup>. First joint of hind tarsi as long as or longer than the others together; arolia small.

*b*<sup>1</sup>. Eyes at least as far apart as the antennal scrobes; tegmina more or less abbreviate, especially in the female.

*Stylopyga* Fischer de W.

$\delta^2$ . Eyes less distant than the antennal scrobes; tegmina fully developed in both sexes. . . . *Periplaneta* Burmeister.

Pelmatosilpha and Stylopyga have only a single representative each; the others have two or three species each. The species of Stylopyga and Periplaneta are introduced forms (from the Old World or the American tropics) and now occur widely over the United States. The others are found only in the extreme south.

#### PANCHLORINAE.

The two genera of this subfamily occurring in the United States are each represented by a single introduced species, and may be distinguished thus:—

##### *Genera of Panchlorinae.*

$\alpha^1$ . First joint of hind tarsi densely biserially setose beneath through the greater part of its length, and furnished at tip with a small naked plantula. . . . *Panchlora* Burmeister.

$\alpha^2$ . First joint of hind tarsi bare or nearly bare of bristles beneath, a naked plantula extending very narrowly over the whole joint. *Pycnoscelus* Scudder.

#### CORYDINAE.

Represented in the region adjoining Mexico by Homoeogamia Burmeister, of which we have probably more than one species.

#### PLECTOPTERINAE.

A single species or two of Chorisoneura Brunner occur in the extreme southern states from Georgia to Texas.

#### PANESTHINAE.

The anomalous genus Cryptocercus Scudder is represented by a single species found from Virginia to California.

## MANTIDAE.

Only eleven genera of this family are found in the United States and only two of the six subfamilies are recognized, and one of these by but a single species, an interloper from further south, as is the case also with some of the genera of Mantinae, the subfamily to which the others belong. The species are all confined to the southern half of the United States, and most of them to the extreme southern margin. The family is notoriously a tropical one.

*Subfamilies of Mantidae.*

*A*<sup>1</sup>. Upper surface of middle and hind femora and tibiae rounded; head unarmed. . . . . *Mantinae*.

*A*<sup>2</sup>. Upper surface of middle and hind femora and tibiae carinate; middle of head with an erect process as long as the rest of the head. . . . . *Vatinae*.

## MANTINAE.

The larger development of this group in the United States would be looked for from its preponderance further south. Most or all of the genera occur also beyond the southern boundaries of the United States, so that we have no endemic genera unless *Bactromantis* be excepted.

*Genera of Mantinae.*

*A*<sup>1</sup>. Inner margin of upper surface of fore coxae not conspicuously dilated apically.

*b*<sup>1</sup>. Pronotum but slightly longer than fore coxae; eyes more or less conical; hind femora armed exteriorly with an apical spine.

*c*<sup>1</sup>. Eyes distinctly pointed (conico-acuminate) above; hind femora delicately incrassate basally, in the ♀ nearly twice as long as the pronotum; tegmina and wings abbreviate or wanting in both sexes; cerci long, distinctly surpassing the infragenital plate. . . . . *Yersinia* Saussure.

$c^2$ . Eyes trigonal, scarcely pointed above; hind femora linear, in the ♀ but little longer than the pronotum; tegmina and wings fully developed in the ♂, abbreviate in the ♀; cerci short, scarcely or not surpassing the infragenital plate. . . . . *Litaneutria* Saussure.

$b^2$ . Pronotum much longer than fore coxae; eyes rotundate; hind femora with no apical spine.

$c^1$ . Antennae filiform.

$d^1$ . Broadest portion of pronotum far in advance of the middle, the sides in front distinctly tapering; outer margin of fore femora armed with main spines only.

$e^1$ . Body of ♂ very elongate; anal membrane of tegmina violet. . . . . *Plasmomantis* Saussure.

$e^2$ . Body of ♂ moderately elongate; anal membrane of tegmina light colored.

$f^1$ . Anal and axillary veins of tegmina independent and simple throughout. . . . . *Callimantis* Stål.

$f^2$ . Anal and axillary veins of tegmina apically confluent. . . . . *Stagnomantis* Saussure.

$d^2$ . Broadest portion of pronotum hardly in advance of the middle, the sides in front parallel or subparallel; outer margin of fore femora armed with numerous distinct spinules between the main spines. . . . . *Gonatista* Saussure.

$c^2$ . Antennae incrassate beyond the base and thereafter tapering. . . . . *Brunneria* Saussure.

$A^2$ . Inner margin of upper surface of fore coxae abruptly and considerably dilated at apex.

$b^1$ . Fore tibiae longer than their apical claw.

$c^1$ . Fore and hind sections of pronotum subequal in length. . . . . *Oligonyx* Saussure.

$c^2$ . Hind section of pronotum twice as long as fore section. . . . . *Bactromantis* Scudder.

$b^2$ . Fore tibiae no longer than their apical claw.

. . . . . *Thesprotia* Stål.

Of these ten genera hardly one contains more than one or two species and all are southern in their range. *Litaneutria*, however, found only in the west, has three or four species; the other

genera occur almost exclusively in the Gulf States and two, *Callimantis* and *Bactromantis*, are known only from Florida. *Yersinia* has a single species in Eastern Colorado and neighborhood. Nearly or quite all these genera are represented, often much more fully, south of our border, including several of our species.

#### VATINAE.

This subfamily is represented in the United States by only a single genus, *Theoclytes* Serville, a single species of which occurs along our southern border.

## PHASMIDAE.

This family is very feebly represented in the United States, only half a dozen different genera with from one to three species each having been detected. These few species, however, represent three of the dozen recognized subfamilies. With the exception of *Diapheromera* which has a wide distribution, most of the species are found only in the west or the extreme south. One genus is confined to the United States.

All of our species are apterous, and though, on occasion, the males may run with some rapidity, they are all generally sluggish in movement, and depend for their protection largely on their resemblance to twigs and on the action of their prothoracic glands, which may emit an offensive fluid or spray when the insect is alarmed. Their eggs are dropped loosely and singly on the ground; they are of very varied structure, covered with an exceedingly hard and often strikingly sculptured shell, and so far as we know continue through the winter, sometimes through a second, before hatching. Our commonest species feeds upon the tough leaves of the oak.

*Subfamilies of Phasmidae.*

A<sup>1</sup>. Tibiae not furnished at apex with a sunken areola to receive the base of the tarsi when bent upon them. (The antennae are much longer than the anterior femora and furnished with at least thirty joints, and the median segment is much shorter than the metanotum.) . . . . . *Bacunculinae*.

A<sup>2</sup>. Tibiae furnished at apex beneath with a sunken areola to receive the base of the tarsi when bent upon them.

b<sup>1</sup>. Antennae many jointed, longer than the fore femora; median segment shorter than the metanotum; without spines on head, thorax or legs; anterior segments of abdomen transverse, at least in the ♀. . . . . *Anisomorphinae*.

b<sup>2</sup>. Antennae with less than twenty joints, shorter than the fore femora; anterior segments of abdomen much longer than broad. . . . . *Bacillinae*.

## BACUNCULINAE.

This is an American group and of the eleven genera recognized we have three, which may be distinguished by the following table:—

*Genera of Bacunculinae.*

*a*<sup>1</sup>. Hind femora armed beneath on the median line near apex with one or more distinct spines. . . . . *Diapheromera* Gray.

*a*<sup>2</sup>. Hind femora unarmed beneath next apex.

*b*<sup>1</sup>. Head, especially in the ♀, furnished in front between the eyes with a pair of tubercles or longitudinal rugae, sometimes highly developed; hind femora of ♀ hardly extending beyond the middle of the fourth abdominal segment, relatively stout; first joint of hind tarsi of ♀ shorter than the other joints together. . . . . *Sermyle* Stål.

*b*<sup>2</sup>. Head unarmed in both sexes; hind femora of ♀ reaching the end of the fourth abdominal segment, relatively slender; first joint of hind tarsi of ♀ about equal to the other joints together. . . . . *Bacunculus* Burmeister.

The genera have been but little studied in this country. *Diapheromera* is represented nearly everywhere and has several species, probably including some as yet undescribed. The other genera occurs only in the Gulf States, with one or two species each.

## ANISOMORPHINAE.

This also is an American group, with about half a dozen known genera of which we possess two.

*Genera of Anisomorphinae.*

*a*<sup>1</sup>. Mesothorax twice as long as the prothorax; basal joint of antennae but little longer and little stouter than the second.

. . . . . *Anisomorpha* Gray.

*a*<sup>2</sup>. Mesothorax no longer than prothorax; basal joint of antennae fully twice as long and, especially on apical half, twice as stout as the second joint. . . . . *Timema* Scudder.



Several nominal species of *Anisomorpha* occur in the extreme south and especially the southeast, but they have not yet been carefully compared. *Timema* occurs in central California, with a single species, and is not otherwise known.

#### BACILLINAE.

This small subfamily of only four recognized genera is represented by a single genus, *Bacillus* Latreille, two species of which are known from Colorado and Arizona.

## ACRIDIIDAE.

Only four of the nine subfamilies of Acridiidae are represented in the United States, although three others occur in more southern portions of America. Yet on the whole this family is better developed in our district than is any other and contains some genera, especially *Melanoplus*, of very great extent.

*Subfamilies of Acridiidae.*

*A*<sup>1</sup>. Claws without arolium; pronotum extending over the abdomen; tegmina lobiform. . . . . *Tettiginae*.

*A*<sup>2</sup>. Claws furnished with an arolium; pronotum extending at most over the extreme base of the abdomen; tegmina generally well developed, but sometimes abbreviate, lobiform or wanting.

*b*<sup>1</sup>. Prosteronum without marked prominence (sometimes with an obtuse tubercle); arolium usually small or rather small.

*c*<sup>1</sup>. Face retreating and angulate at meeting with vertex; foveolae generally well developed; fastigium usually but little declivent; eyes generally longer than the infraocular portion of the genae; mediastinal and scapular fields of tegmina generally regularly reticulate by transverse veins.

*Trypaelinae*.\*

*c*<sup>2</sup>. Face nearly or quite vertical, and rounded at meeting with vertex; foveolae generally obscure; fastigium usually strongly declivent; eyes generally shorter than the infraocular portion of the genae; mediastinal and scapular fields of tegmina generally very irregularly reticulate.

*Oedipodinae*.\*

*b*<sup>2</sup>. Prosteronum armed anteriorly with a distinct conical or cylindrical spine. . . . . *Acridiinae*.

\* These two subfamilies are occasionally difficult to distinguish, and I accordingly give here, in an English form, the detailed distinctions laid down by Stål (Rec. Orthopt., i, 6-7).

Fastigium of vertex not or slightly, rarely strongly, declivent; front trending more or less, generally strongly and obliquely, backward; eyes generally longer than the infraocular portion of the genae, rarely shorter or of equal length, and in these cases the front is very oblique; antennae sometimes ensiform, inserted between the middle or below the middle (inter medium vel pone medium) of the eyes. Metazona rarely longer, generally shorter than the prozona, the hind margin rarely rectangulate or

## TETTIGINAE.

Of the seven larger groups into which Bolivar divides this subfamily, we possess only two neighboring ones, though two others occur directly south of us.

*Groups of Tettiginæ.*

$\alpha^1$ . Anterior femora more or less compressed, carinate above; antennae with 12–14 joints. . . . . *Tettigiae*.

$\alpha^2$ . Anterior femora distinctly and broadly sulcate above; antennae with 16–22 joints. . . . . *Batrachideæ*.

subrectangulate, generally obtuse, the median carina not cristate; sulci of the prozona either obliterated or interrupted on the disk, the posterior of these not or but very slightly recurved, never confluent with the principal sulcus [*i. e.*, that separating the prozona and metazona]; lateral lobes generally narrowed in passing downward, rarely longer than deep, with parallel anterior and posterior margins; tegmina generally lacking the intercalary vein, the anal and axillary veins generally united at a greater or less distance from the base; arolia generally of medium size or large; metasternal lobes not or but slightly separated. . . . . *Tryxalinae*.

Fastigium of vertex generally strongly declivent, slightly or very slightly prominent; front not or very slightly oblique, generally vertical or subvertical; eyes generally small or rather small, rarely a little longer than the infraocular portion of the genae; antennae linear or sublinear, generally inserted above the middle of the eyes, sometimes almost above the eyes themselves (plerumque ante medium, interdum fere ante oculos). Pronotum furnished with a median carina often wholly or partly cristate, the metazona typically longer than the prozona, the hind margin generally rectangulate or subrectangulate, the sulci of the prozona either interrupted, or the anterior sulcus alone continuous and bisecting the carina or crest, rarely both continuous, the posterior sulcus recurved and frequently confluent with the principal sulcus; lateral lobes transverse [*i. e.*, longer than deep] or subtransverse, the front and hind margins parallel or subparallel; tegmina generally furnished with an intercalary vein, the anal and axillary veins frequently running free to the margin; hind femora generally broad, and above and below compressed; arolia small; metasternal lobes generally somewhat distant. . . . . *Oedipodinae*.

To this may be added the following from Brunner (Rév. syst. Orthopt., 102, note):—

The distinction between the Tryxalinae and Oedipodinae is somewhat arbitrary and rests on individual perception (l'estimation personnelle). When, however, the relative position of the front and the vertex [on which he rests his tabular distinction] leaves one in doubt, the presence or absence of foveolae may guide one, Tryxalinae having in this case very distinct foveolae, while in the Oedipodinae they are effaced. Moreover the species here taken with consideration, when they are Tryxalinae, have the mediastinal and scapular areas of the tegmina regularly reticulate by transverse veinlets; while, if they are Oedipodinae, these areas are always very irregularly reticulated.

See also McNeill's paper on Tryxalinae (pp. 181–182) for a tabulation of differences between the Tryxalinae and Oedipodinae.

## Tettigidae.

We possess representatives of half the known genera of this group, the other genera belonging mostly to the Old World.

*Genera of Tettigidae.*

$\alpha^1$ . Median carina of pronotum cristiform; superior lateral sinus (at insertion of tegmina) shallow, not nearly so deep as the inferior sinus. . . . . *Nomotettix* Morse.

$\alpha^2$ . Median carina of pronotum low; superior lateral sinus of same nearly as deep as the inferior sinus.

$b^1$ . Vertex of fastigium generally broader than the eyes, projecting beyond them, generally angulate anteriorly.

*Tettix* Charpentier.

$b^2$ . Vertex of fastigium narrower than the eyes and not projecting beyond them, usually truncate anteriorly.

*Paratettix* Bolivar.

All these genera are widely distributed in our country, *Tettix* being the most numerous in species, followed by *Paratettix*. *Monotettix* is confined to North America.

## Batrachideae.

Only two of the seven known genera of this group occur in the United States, though three others are found in America.

*Genera of Batrachideae.*

$\alpha^1$ . Body plump; dorsum of pronotum tumid, smooth or slightly punctate, with no antehumeral lateral carinae. *Paxilla* Bolivar.

$\alpha^2$ . Body more slender; dorsum of pronotum more or less concave between the carinae, marked with longitudinal rugae and with conspicuous antehumeral lateral carinae.

*Tettigidea* Scudder.

*Paxilla* is monotypic and known only from Georgia; *Tettigidea* is wide spread, extending also to Central and South America, and has several species in the United States.

## TRYXALINAE.

This subfamily has a varied development in the United States, where at least thirty-five genera occur, none of them very rich in species, though most of the genera are endemic.

The following table to separate them is copied from McNeill's just published Revision of our Tryxalinae, excepting as it is altered to correct some slight clerical errors, to change some generic names, to include the genera purposely omitted by him, which seem to me (contrary to an opinion formerly expressed — *Psyche*, v, 431 seq.) to belong here, and to omit one genus belonging elsewhere. The order and alliance of genera in this table (especially as here altered) leave much to be desired, but the construction of a substitute would too long delay the publication of this Guide, which has been awaiting the appearance of Professor McNeill's paper for its completion.

*Genera of Tryxalinae.*

*a*<sup>1</sup>. Head distinctly longer than the pronotum; eyes very oblique, nearly horizontal; metasternal lobes contiguous.

*b*<sup>1</sup>. Tegmina very much shorter than the abdomen; spines of posterior tibiae minute and numerous, about twenty-five.

*Rhadinotatum* McNeill.

*b*<sup>2</sup>. Tegmina exceeding the abdomen; spines of posterior tibiae less numerous, about sixteen. *Achurum* Saussure.

*a*<sup>2</sup>. Head sometimes equalling, never exceeding, the pronotum in length.

*b*<sup>1</sup>. Head ascending, more or less conical, the occiput elevated considerably above, or inclined upward at a distinct angle with, the pronotum.

*c*<sup>1</sup>. Head as viewed laterally strongly ascending or greatly raised above the pronotum.

*d*<sup>1</sup>. Upper half of head markedly conical; face below fronto-vertical process subperpendicular; antennae more than half as long as tegmina.

*e*<sup>1</sup>. Metazona much longer than prozona, with an elevated crest. . . . *Acrolophitus* Thomas.

$e^2$ . Metazona barely longer than prozona, only slightly carinate. . . . . *Acrocara* Scudder.

$d^2$ . Upper half of head only feebly conical, more or less tumid; face below fronto-vertical process distinctly oblique; antennae less than half as long as tegmina.

$e^1$ . Vertex of the head forming an acute angle with the face; tempora nearly plane triangular spaces.

*Bootettix* Bruner.

$e^2$ . Vertex of the head forming an obtuse angle with the face; tempora impressed, trapezoidal.

*Ligurotettix* McNeill.

$c^2$ . Head as viewed laterally less, though distinctly, ascending.

$d^1$ . Antennae much longer than the face; lower margin of lateral lobes anteriorly excised, broadly exposing the pleura. . . . . *Pedioscirtetes* Thomas.

$d^2$ . Antennae shorter than the face; lower margin of lateral lobes nearly horizontal throughout, scarcely exposing the pleura. . . . . *Gymnes* Scudder.

$b^2$ . Head elevated above the pronotum at most only by the feeble tumescence of the occiput, and not otherwise forming any angle with the pronotum.

$c^1$ . Mesosternal lobes separated by a space almost linear in its narrowest part; metasternal lobes approximate in both male and female. . . . . *Mermiria* Stål.

$c^2$ . Mesosternal lobes separated by a space never much longer than broad, generally broader than long; metasternal lobes rarely approximate in the male, very rarely in the female.

$d^1$ . Antennae triquetrous, or strongly depressed at the base and distinctly acuminate; pronotum with the lateral lobes vertical and straight and the lateral carinae not at all sinuate; median carina of the pronotum generally cut much behind the middle; the disk plain and unstriped.

$e^1$ . Tegmina exceeding the abdomen considerably in both sexes (in some large females but little); lateral carinae of the pronotum quite as distinct as the median; spurs at the apex of the posterior tibiae on the inner side about equal. . . . . *Tryxalis* Fabricius.

$e^2$ . Tegmina not exceeding the abdomen even in the male.

$f^1$ . Lateral foveolae of the vertex linear and distinct; tegmina quite unspotted; inner spurs of posterior tibiae equal. . . . . *Napaia* McNeill.

$f^2$ . Lateral foveolae less distinct and subtriangular or obsolete; tegmina more or less distinctly spotted as well as the face and pronotum; inner tibial spurs very unequal, the longer but little shorter than the first tarsal joint. . . . . *Opeia* McNeill.

$d^2$ . Antennae never triquetrous, sometimes plainly depressed basally and acuminate, most commonly filiform, rarely clavate; pronotum with the lateral lobes less distinctly vertical, with the lateral carinae very rarely quite straight, but gently or strongly sinuate near the middle; median carina of the pronotum generally cut in or not far behind the middle.

$e^1$ . Tempora either foveolate or plane, not visible from above.

$f^1$ . Scutellum of the vertex with a distinct median carina, which is usually a coarse raised line stronger anteriorly.

$g^1$ . Spurs on the inner side of posterior tibiae very unequal, the apical spur being twice as long as the other.

$h^1$ . Antennae depressed basally and distinctly acuminate; no supplementary carinae present either upon the head or disk of the pronotum.

*Pedeticum* McNeill.

$h^2$ . Antennae depressed apically and somewhat clavate; supplementary carinae accompanying the median carina upon either the head or the disk of the pronotum. . . . . *Eritettix* Bruner.

$g^2$ . Spurs of the inner side of the posterior tibiae about equal in length.

$h^1$ . Spines on the exterior margin of the posterior tibiae 19-21. . . . . *Syrbula* Stål.

*h*<sup>2</sup>. Spines on the exterior margin of the posterior tibiae not exceeding 15.

*i*<sup>1</sup>. Median carina of the pronotum cut in the middle by the principal sulcus.

*j*<sup>1</sup>. Color striped distinctly or obscurely; scapular area of the tegmina broader than the mediastinal area.

*k*<sup>1</sup>. Lateral carinae of the pronotum obsolete; median carina accompanied by a supplementary pair upon the disk.

*Amphitornus* McNeill.

*k*<sup>2</sup>. Lateral carinae of the pronotum present; median carina not accompanied by supplementary carinae on the disk.

*Acentetus* McNeill.

*j*<sup>2</sup>. Color plain; scapular area of the tegmina not broader than the mediastinal area.

*Amblytropidia* Stål.

*i*<sup>2</sup>. Median carina of the pronotum cut much behind the middle by the principal sulcus.

*Chloealtis* Harris.

*f*<sup>2</sup>. Scutellum of the vertex with no distinct median carina.

*g*<sup>1</sup>. Median carina of the pronotum cut much behind the middle by the principal sulcus.

*h*<sup>1</sup>. Posterior margin of the metazona angulate; tegmina usually much shorter than the abdomen, with the ulnar area not very much wider than the discoidal area. . . . *Dichromorpha* Morse.

*h*<sup>2</sup>. Posterior margin of the metazona rounded or not distinctly angulate; tegmina not much shorter than the abdomen, with the ulnar area very wide and several times as broad as the discoidal area. . . . *Ctinocephalus* Morse.

*g*<sup>2</sup>. Median carina cut near the middle by the principal sulcus.



*h*<sup>1</sup>. Hind tibiae never red. . . . . *Orphula* Stål.

*h*<sup>2</sup>. Hind tibiae red.

*i*<sup>1</sup>. Antennae depressed basally, long and acuminate; face strongly oblique.

*Alpha* Brunner.

*i*<sup>2</sup>. Antennae filiform; face moderately oblique in the male, subperpendicular in the female.

*Phlibostroma* Scudder.

*e*<sup>2</sup>. Tempora plain or foveolate, visible from above (in *Mecostethus* small or minute, triangular and basal; in this case the intercalary vein is very strong).

*f*<sup>1</sup>. The vertex is not bounded in front by a raised line and, viewed from the side, does not form an angle with the face; the tempora are very faintly impressed spaces, which are strongly declivent; intercalary vein of tegmina wanting.

*g*<sup>1</sup>. Tegmina plain; lateral carinae of the pronotum very little sinuate. . . . . *Boopedon* Thomas.

*g*<sup>2</sup>. Tegmina distinctly spotted; lateral carinae of the pronotum strongly sinuate.

*Plectrotettix* McNeill.

*f*<sup>2</sup>. Vertex bounded in front by a raised line; viewed from the side it forms a more or less distinct angle with the face, or it is not at all angulate.

*g*<sup>1</sup>. Median carina of the pronotum high and sharp, cut by the principal sulcus in or plainly in front of, the middle; intercalary vein very strong; apical spurs on inner side of posterior tibiae subequal.

*Mecostethus* Fieber.

*g*<sup>2</sup>. Median carina of the pronotum rarely cut plainly in front of the middle, and in this case it is not high and sharp, or the intercalary vein is not strong. (In *Stirapleura* and *Psoloessa* the intercalary vein is present but not very strong and the inner apical spurs of the posterior tibiae are very unequal).

*h*<sup>1</sup>. Temporae longate, narrow, from two to four times as long as broad; apical spur on inner side of posterior tibiae much less than twice as long as the one beside it.

*i*<sup>1</sup>. Antennae filiform.

*j*<sup>1</sup>. Median carina of the pronotum cut in the middle; posterior margin of the pronotum plainly more angulate than the anterior.

*Stenobothrus* Fischer.

*j*<sup>2</sup>. Median carina of the pronotum cut plainly behind the middle; posterior margin of the pronotum not more angulate than the anterior.

*Bruneria* McNeill.

*i*<sup>2</sup>. Antennae clavate.

*Gomphocerus* Thunberg.

*h*<sup>2</sup>. Tempora short, little longer than broad or, when twice as long as broad, the apical spur on the inner side of the posterior tibiae is twice as long as the one beside it.

*i*<sup>1</sup>. Posterior margin of the metazona straight or just perceptibly angulate; pronotum shorter than the head, which is very large.

*Eupniigodes* McNeill.

*i*<sup>2</sup>. Posterior margin of the metazona distinctly or strongly angulate; pronotum never shorter than the head, generally plainly longer (viewed from above).

*j*<sup>1</sup>. Median carina of the pronotum cut by principal sulcus behind the middle; vertex of the head destitute of a median carina; posterior margin of the metazona generally very obtusely angulate or rounded.

*k*<sup>1</sup>. Generally larger forms. Median carina of prozona cut by the transverse sulci; foveolae of male vertex triangular or subtriangular; hind tibiae blue; lower

apical spur of inner side of same much less than half as long again as upper spur.

*Aulocara* Scudder.

*k*<sup>2</sup>. Generally smaller forms. Median carina of prozona not cut by the transverse sulci; foveolae of male vertex subequal, rhomboidal; hind tibiae red; lower apical spur of inner side of same fully half as long again as upper spur.

*Ageneotettix* McNeill.

*j*<sup>2</sup>. Median carina of the pronotum cut by principal sulcus more or less plainly in front of the middle, never behind; summit of the head furnished with a more or less distinct median carina, which sometimes extends nearly or quite to the tip of the vertex, and is most distinct on the posterior part of the scutellum; posterior part of the metazona strongly angulate.

*k*<sup>1</sup>. Lateral lobes of the pronotum furnished with a single or double series of short, irregular, and sometimes indistinct carinae which extend from about the middle of the anterior margin toward or to the upper posterior angle; also with a second more distinct, low, broad, light-colored carina which extends from the middle of each lobe toward the lower posterior angle; sometimes this carina is distinct only at the anterior end; face nearly perpendicular, rarely very moderately inclined; frontal costa sulcate throughout, acuminate at the vertex and regularly divergent below.

*Stiraplenura* Scudder.

*k*<sup>2</sup>. Lateral lobes of the pronotum destitute of carinae; face distinctly and con-

siderably oblique; frontal costa not sharply acuminate above and scarcely sulcate at any point. *Psoloessa* Scudder.

Excepting *Mermiria*, the first thirteen of these genera, as well as *Acentetus*, *Amblytropidia*, *Clinocephalus*, *Phlibostroma*, *Plectrotettix* and *Bruneria*, or more than half the total, are only known in our country by single species; the others have from two to six each, and *Orphula* probably more than that. *Orphula* appears to be the only genus spread over the entire country; some are so far known only from a single state, as *Rhadinotatum* and *Pedeticum* from Florida, *Acentetus* from Colorado, *Aerocara* from Idaho and *Pedioscirtetes* from Nevada. *Clinocephalus* is confined to the Atlantic States, *Tryxalis* (*Metaleptea* Brunner) to the region east of the Great Plains; *Psoloessa* is known only from the extreme south, from Texas westward, *Achurum* and *Bootettix* in the extreme southwest. The great plains east of the Rocky Mts. are characterized by *Opeia*, *Phlibostroma* (*Beta* Brunner), *Boopedon* and *Aerolophitus*, while they share with the region to the west of them, as far as the Sierras or even the coast, the genera *Stirapleura* (*Pseudostauronotus* Brunner), *Alpha*, *Amphitornus*, *Mermiria*, *Anlocara* (*Oedocara* Scudder, *Coloradella* Brunner) and *Ageneotettix* (*Eremnus* McNeill). *Gomphocerus* is found in the same region, but only in its northern portions. *Chloealtis*, *Dichromorpha*, *Mecostethus* and *Stenobothrus* are also found in the northern half of our country (and in Canada) from the Atlantic to the Rocky Mts. or even to the Sierras, while an equivalent southern district is inhabited by *Amblytropidia*, *Syrbula* and *Eritettix*. Finally, the genera *Ligurotettix*, *Gymnes*, *Napaia*, *Plectrotettix* (*Plectrophorus* McNeill), *Bruneria* (*Brunneria* McNeill) and *Eupnigodes* (*Pnigodes* McNeill) are confined to the Pacific coast.

#### OEDIPODINAE.

This is one of the prevailing groups of *Aceridiidae* in the United States, and especially in the western half of the continent. Two of the tribes occur, the *Thrineini* being unknown. Our genera are in large part indigenous.

*Tribes of Oedipodinae.*

- $a^1$ . Outer margin of hind tibiae with no apical spine next the spurs. . . . . *Oedipodini*.  
 $a^2$ . Outer margin of hind tibiae with an apical spine next the spurs. . . . . *Eremobiini*.

*Oedipodini.*

This tribe is very varied in type, no less than twenty-three genera occurring in the United States, out of the sixty odd recorded by Saussure from the whole world. All our genera are neogeic and in large part confined to the United States or shared only with Mexico.

*Genera of Oedipodini.*

$A^1$ . Interspace between the metasternal foramina linear, or distinctly longer than broad in the male, narrower than the interspace between the mesosternal lobes in the female.

$b^1$ . Tegmina subcoriaceous, densely and irregularly reticulate, only at the apex remotely (but scarcely regularly) areolate; the intercalary vein nearer the median than the ulnar vein; wings brightly colored, red or yellow at base; none of the veins incrassate and no costal stigma; ulnar area not noticeably dilated. . . . . *Arphia* Stål.

$b^2$ . Nearly the whole apical half of the tegmina, at least in the discoidal field, membranaceous, traversed by straight veinlets; the intercalary distant from the median vein; wings with dilute coloring, nebulous; the veins next the costal margin and frequently, in the male, the median vein incrassate; costa with a dusky stigma; ulnar area dilated, with remotely scalariform venation.

$c^1$ . The intercalary vein of the tegmina running midway between the median and ulnar veins, only apically a little approximating the former; veins of the wings slightly or scarcely incrassate. . . . . *Chortophaga* Saussure.

$c^2$ . The intercalary vein of the tegmina distinctly nearer the ulnar than the median vein; the veins of the wings referred to (under  $b^2$ ) distinctly incrassate in the male.

$d^1$ . Antennae very short, stout; head compressed, the fastigium prominent, angulate. *Chimarocephala* Seudder.

$d^2$ . Antennae rather long, slender; head subtumid, rotundate, the fastigium in the female anteriorly obtuse.

*Eucoptolophus* Seudder.

$A^2$ . Interspace between the metasternal foramina rather broad, in the male quadrate, in the female transverse.

$b^1$ . Lateral canthi of the metazona traversing the principal sulcus (where they are frequently cristulate or rugose), not intersected by that sulcus (or only in individual cases); principal sulcus more or less obsolete or delicate in the lateral lobes.

$c^1$ . Carina of pronotum conspicuous; tegmina with moderately dense reticulation, at least the apical third remotely and quadrately reticulated.

$d^1$ . Smaller forms. Pronotum not rugose; wings subvitreous, the area of the median forks obscurely divided or with only one row of areoles. . . . *Camula* Stål.

$d^2$ . Larger forms. Pronotum rugose; wings colored, the area of the median forks divided for the larger part by a spurious vein, and so biareolate. *Hippiscus* Saussure.

$c^2$ . Carina of pronotum very slight; nearly the whole of the tegmina densely reticulate and coriaceous, only membranaceous or subvitreous at extreme tip.

$d^1$ . Less stout; mesosternum only a little broader than the head; tegmina extending well beyond tip of abdomen, the intercalary vein distinct throughout and everywhere very much nearer the median than the ulnar vein; transverse fascia of wings with no subcostal taenia; posterior process of pronotum acutangulate. . . . *Leprus* Saussure.

$d^2$ . Exceptionally stout; mesosternum fully half as broad again as head; tegmina leaving tip of abdomen exposed, the intercalary vein more or less obscure proximally and only a little nearer the median than the ulnar vein; transverse fascia of wings with distinct subcostal taenia; posterior process of pronotum rectangulate.

*Aggymnastus* Seudder.

*b*<sup>2</sup>. Lateral canthi of the metazona typically intersected by the principal sulcus, often vanishing anterior to that; principal sulcus distinctly developed on the lateral lobes.

*c*<sup>1</sup>. Pronotal carina entire or intersected by but one sulcus.

*d*<sup>1</sup>. Pronotum with a very high foliaceous crest.

*Tropidolophus* Thomas.

*d*<sup>2</sup>. Pronotum crested or carinate, but not excessively.

*e*<sup>1</sup>. Body slender, compressed; lateral foveolae of the head trigonal, short.

*f*<sup>1</sup>. The whole of the apical third of the tegmina, even next the costal margin, membranaceous.

*g*<sup>1</sup>. The intercalary vein of the tegmina very distinct, retroarcuate, rather remote from the median vein, nearly intermediate between it and the ulnar; the anterior intercalary area, therefore, rather broad; wings conspicuously marked, but not banded.

*Dissosteira* Scudder.

*g*<sup>2</sup>. The intercalary vein of the tegmina more or less distinct, hardly arcuate, nearer the median than the ulnar vein; the anterior intercalary area, therefore, narrow, densely coriaceous; wings with a fuscous arcuate median band.

*h*<sup>1</sup>. Tegmina rather broad, the intercalary vein more or less flexuous; pronotal crest anteriorly elevated, profoundly intersected, arcuate on the metazona as seen laterally.

*Spharagemon* Scudder.

*h*<sup>2</sup>. Tegmina very narrow, the intercalary vein straight, subobsolete; pronotal crest low, straight as seen laterally, not deeply intersected.

*Scirtettica* Saussure.

*f*<sup>2</sup>. The apical membranaceous portion of the tegmina oblique, the costal margin coriaceous.

*Lactista* Saussure.

*e*<sup>2</sup>. Body rather stout; lateral foveolae of the head lanceolate. . . . *Tomonotus* Saussure.

*c*<sup>2</sup>. Pronotum or pronotal carina twice intersected by transverse sulci.

*c*<sup>1</sup>. Pronotal carina percurrent, not obliterated between the sulci.

*e*<sup>1</sup>. Pronotum cristate anteriorly; tegmina generally membranaceous over most of the apical half.

*f*<sup>1</sup>. Lateral lobes of the pronotum posteriorly rectangular or obtusangulate, the posterior margin descending obliquely forward; their metazonal portion, posterior to the typical sulcus, thereby narrowed inferiorly; prozona posteriorly scutellate on disk; vertex of head with a transverse carinula on either side next the eyes. . . . *Derotmema* Scudder.

*f*<sup>2</sup>. Posterior portion of the lateral lobes of the pronotum of equal width throughout.

*g*<sup>1</sup>. Inferior margin of lateral lobes oblique, the posterior angle thereby acute or posteriorly produced.

*h*<sup>1</sup>. Lateral canthi of the metazona terminating at the principal sulcus, or, if continued, it is in a different course; prozona posteriorly scutellate on disk; inferior margin of lateral lobes straight, the posterior concave; tegmina fasciate or maculate; head tumid, the frontal costa moderately constricted. . . . *Mestobregma* Scudder.

*h*<sup>2</sup>. Lateral canthi of the metazona acute, passing in the same course beyond the principal sulcus.

*i*<sup>1</sup>. Disk of prozona not posteriorly scutellate; inferior margin of the lateral lobes straight or areolate, the posterior concave, the angle slightly produced posteriorly; frontal costa of head very strongly compressed; proximal half of tegmina densely coriaceous. *Psimidia* Stål.

*i*<sup>2</sup>. Disk of prozona more or less distinctly scutellate posteriorly; lower margin of the lateral lobes straight and oblique, the posterior margin nearly straight, the angle produced



inferiorly; head narrow, its frontal costa moderately constricted; tegmina densely reticulate, fasciate on the costal margin, only the distal third membranaceous. *Conozoa* Saussure.

*g*<sup>2</sup>. Inferior margin of lateral lobes horizontal, but anteriorly oblique, the posterior angle rounded rectangular; disk of prozona scarcely or not scutellate posteriorly, the distal third of the tegmina membranaceous.

*h*<sup>1</sup>. Radiate veins of anal field of wings normal.

*Trimerotropis* Stål.

*h*<sup>2</sup>. Radiate veins of anal field of wings distinctly incrassate. . . . . *Circotettix* Scudder.

*e*<sup>2</sup>. Pronotum delicately carinulate; tegmina densely coriaceous-reticulate, only the distal fourth membranaceous. . . . . *Haudrotettix* Scudder.

*d*<sup>2</sup>. Pronotal carina obliterated between the sulci.

*e*<sup>1</sup>. Only the proximal third of tegmina densely reticulate and coriaceous; intercalary vein distinctly developed. . . . . *Anconia* Scudder.

*e*<sup>2</sup>. Fully the proximal two-thirds of tegmina densely reticulate and coriaceous; intercalary vein lacking or indistinct. . . . . *Heliastus* Saussure.

The richest of these genera are *Hippiscus* with nearly forty species, *Arphia* and *Trimerotropis*, each with about twenty, *Mesotobregma* (*Trachyrachys* Scudder) with eight or ten, and *Spharagemon* with nearly as many; all these genera occur everywhere, excepting *Mesotobregma*, which is found only in the west, where the others are also more numerous in species. *Circotettix* with about half a dozen species occurs only in the north, but from Atlantic to Pacific. Other genera which range over the whole country or nearly so are *Chortophaga* and *Dissosteira* with two or three species each. *Chimarocephala*, *Agymnastus* and *Lactista*, each with about two species, are confined to California; *Encoptolophus*, *Scirtettica* and *Psinidia*, with two or three species each, to the eastern half of the continent; *Cammula* with a single

species ranges across the continent near the northern boundary of the United States; *Leprus* with two species occurs in California, Texas and Colorado; *Tomonotus* with two species in Texas; *Anconia* and *Heliastus*, with two or three species each, in California, Arizona, southern Utah and New Mexico. The other genera, with from one to four species each but ordinarily with only one or two, are confined to the high plateau region of the western Cordilleras. Nearly half of our genera occur also in Mexico, often with more numerous species. Other uncharacterized genera also occur in our territory.

#### Eremobiini.

Three only out of the fourteen known genera of this tribe occur in the United States, and only one of these is peculiar to it.

#### *Genera of Eremobiini.*

*a*<sup>1</sup>. Body stout but subcylindric, more compressed than depressed, normal or subnormal; hind femora normally elongate, much more than half as long as the body, above smooth, simply carinate.

*b*<sup>1</sup>. Intraocular space more than twice the breadth of the eyes as seen from above; pronotum rather gently narrowing from behind forward, sharply carinate, posteriorly truncate, the lateral lobes rapidly and greatly narrowing inferiorly; tegmina lobiform, lateral; wings rudimentary; hind legs excessively stout, the femora scarcely compressed; arolia very large.

*Brachystola* Scudder.

*b*<sup>2</sup>. Intraocular space narrower than the width of the eyes as seen from above; pronotum rapidly narrowing from behind forward, feebly carinulate, with blunt lateral rugae, the lateral lobes subequal in width throughout; tegmina and wings fully developed; hind legs normal; arolia minute. *Tytthotyle* Scudder.

*a*<sup>2</sup>. Body gross, short, subfusiform, more depressed than compressed; hind femora exceptionally broad and only half as long as the body, compressed, above tuberculate and laminato-carinate.

*Haldemanella* Saussure.

These genera are western and particularly southwestern, and have one or two species each, in our territory.

## ACRIDIINAE.

This subfamily is richly represented in the United States, as compared for instance with Europe, but poorly endowed as compared with other parts of the world. The groups found with us appear in the following table :—

*Groups of Acridiinae.*

*A*<sup>1</sup>. Hind tibiae furnished above with an apical spine on both sides.

*b*<sup>1</sup>. Hind tibiae armed with strong spines, those on the inner margin much longer than those on the outer. *Tropidonoti*.

*b*<sup>2</sup>. Hind tibiae armed with moderate spines, of similar length on the inner and outer margins.

*c*<sup>1</sup>. Fastigium of vertex subtriangularly acuminate; frontal costa compressed.

*d*<sup>1</sup>. Pronotum tectiform, the front margin subtriangularly produced, the median carina elevated throughout.

*Taeniopodae*.

*d*<sup>2</sup>. Pronotum plane above, the front margin truncate or emarginate, the median carina lacking on the prozona, but little elevated on the metazona. . . . *Rhomaleae*.

*c*<sup>2</sup>. Fastigium of vertex obtuse; frontal costa neither compressed nor sulcate. . . . *Tropidacres*.

*A*<sup>2</sup>. Hind tibiae with no apical spine on the outer side.

*b*<sup>1</sup>. Face very oblique; fastigium of vertex prominent, more or less acuminate.

*c*<sup>1</sup>. Hind tibiae not expanded apically, the outer margins rounded. . . . *Mesopes*.

*c*<sup>2</sup>. Hind tibiae expanded apically, the outer margins acute.

*Leptysmæ*.

*b*<sup>2</sup>. Face nearly vertical; fastigium of vertex not prolonged, apically obtuse.

*c*<sup>1</sup>. Mesosternal lobes longer than broad, the inner margin straight. . . . *Acridia*.

*c*<sup>2</sup>. Mesosternal lobes transverse or equally long and broad, the inner margin usually rounded.

- $\mathcal{A}^1$ . Hind tibiae armed on exterior margin with at least nine spines\* . . . . . *Melanopli*.  
 $\mathcal{A}^2$ . Hind tibiae with six to eight spines only on the exterior margin. . . . . *Dactylo*ti.

#### Tropidonoti.

Our only representative of this group is the genus *Dracotettix* Bruner, with a superficial resemblance to the Pyrgomorphinae, and of which two species occur in the southern portion of our Pacific coast in California and Arizona.

#### Taeniopodae.

*Dictyophorus* Thunberg is our only genus, the two known species of which occur in our extreme southern states.

#### Rhomaleae.

A single species of *Rhomalea* Burmeister, a tropical genus, occurs in Texas.

#### Tropidacres.

Of the gigantic forms in this group, *Tropidacris* Scudder is the only one which extends north into our territory; a single species is found in Texas and has even been reported as far north as Nebraska.

#### Mesopes.

Our only representative of this small group is *Pseudopomala* Morse, with two or three species in the northern half of our country east of the Rocky Mountains.

#### Leptysmae.

This is an American group, consisting of only two genera, distinguished below.

\* There are occasional individual exceptions to this, where, as by accident as it were, only eight spines are present on one or both tibiae.

*Genera of Leptysmae.*

*a*<sup>1</sup>. Head slightly shorter than the pronotum; fastigium of moderate size, with margins less compressed than in the alternate category. . . . . *Arnilia* Stål.

*a*<sup>2</sup>. Head as long as or longer than the pronotum, strongly exerted; fastigium large, horizontal, noticeably narrowed anteriorly, the margins compressed, at least before the middle.

*Leptysma* Stål.

These genera occur in the extreme southern states along the Gulf of Mexico and have one or two species each.

*Acridia.*

The only recognized genus is *Schistocerca* Stål, with numerous species widely spread over the United States. The species need careful revision.

*Melanopli.*

This group has its highest development in America and especially in North America; its single Old World genus occurs in the north temperate region of Europe and Asia and is not peculiar to it but shared with North America, the half dozen genera not found in our territory being exclusively Central and South American.

*Genera of Melanopli.*

*A*<sup>1</sup>. Lateral margins of subgenital plate (last ventral segment) of male, as seen laterally, straight throughout or very slightly convex, never at all abruptly ampliate at the base.

*b*<sup>1</sup>. Body exceptionally slender; mesosternal lobes subattinent in both sexes; prozona three times as long as metazona.

*Gymnoscirtetes* Bruner.

*b*<sup>2</sup>. Body not exceptionally slender; mesosternal lobes in both sexes so widely separated that the interspace between them is at most twice as long as broad; prozona not more than twice as long as metazona.

*c*<sup>1</sup>. Interspace between mesosternal lobes of female decidedly transverse, sometimes twice as broad as long; of male some-

times transverse, sometimes quadrate or subquadrate; tegmina lobiform, linear, or wanting.

$\alpha^1$ . Apical tubercle of subgenital plate small, extending but a short distance beyond the supraanal plate; cerci of male abruptly narrowed before the middle by excision of the inferior margin, the apical half narrow; lateral carinae of pronotum wholly wanting. *Phaedrotettix* Scudder.

$\alpha^2$ . Nearly the whole subgenital plate forming a blunt conical tubercle projecting some distance beyond the supraanal plate; cerci of male forming broad, apically decurved, subfalcate laminae; lateral carinae of pronotum more or less distinct. . . . *Conalcaea* Scudder.

*c*. Interspace between mesosternal lobes of female generally longer than broad, sometimes quadrate, rarely feebly transverse; of male never at all transverse; tegmina variable.

$\alpha^1$ . Tegmina never fully developed, rarely as long as the pronotum, lateral and ovate or linear, or wholly wanting; hind margin of pronotum distinctly truncate; fore and middle femora of male distinctly more gibbous than in the female.

*e*<sup>1</sup>. Furcula of male wanting, or forming a pair of brief lobes, at most no longer than broad.

*f*<sup>1</sup>. Tegmina lobiform; subgenital plate of male protruding beyond the tip of the supraanal plate by less than half the length of the latter; cerci of male compressed, subequal, the tip broad.

*Rhabdotettix* Scudder.

*f*<sup>2</sup>. Tegmina linear; subgenital plate of male protruding beyond the tip of the supraanal plate by much more than half the length of the latter; cerci of male tapering from the base, the tip acuminate.

*Cyclocercus* Scudder.

*e*<sup>2</sup>. Furcula of male consisting of a pair of parallel, attingent, cylindrical processes, generally at least twice as long as broad. . . . *Paraidemona* Brunner.

*d*<sup>2</sup>. Tegmina fully developed or abbreviate, never much if any shorter than the pronotum; hind margin of pronotum distinctly angulate; fore and middle femora scarcely more gibbous in the male than in the female (except in some species of *Campylacantha*).

*e*<sup>1</sup>. Head not prominent, the summit very slightly arched longitudinally; prosternal spine erect; furcula of male composed of projecting cylindrical fingers; surface of body very feebly pilose. *Hypochlora* Brunner.

*e*<sup>2</sup>. Head prominent, the summit strongly arched longitudinally; prosternal spine more or less retrorse; furcula of male reduced to slight scarcely projecting lobes; surface of the body rather densely pilose.

*Campylacantha* Scudder.

*A*<sup>2</sup>. Lateral margins of subgenital plate of male suddenly ampliate to a considerable degree at the base; or if not to a considerable degree, then the entire margin rather strongly convex or sinuate.

*b*<sup>1</sup>. Subgenital plate of male furnished with a distinct subapical tubercle (*i. e.*, one in which the apical margin does not pass through and form a part of the summit of the tubercle, but where it is distinctly separated from the summit), but not otherwise tumescent (see note under *A*<sup>2</sup> *b*<sup>2</sup>).

*c*<sup>1</sup>. Median carina of pronotum well developed and equally developed throughout, accompanied on the front of the prozona by distinct lateral carinae; prosternal spine sharply acuminate; tubercle of subgenital plate directed wholly backward, occupying the middle of the terminal portion of the plate; furcula distinctly developed. *Eotettix* Scudder.

*c*<sup>2</sup>. Median carina of pronotum feebly developed and generally much more feebly on the prozona than on the metazona, accompanied by no lateral carinae whatever; prosternal spine bluntly acuminate; tubercle of subgenital plate directed upward, or upward and backward, occupying the upper extremity of the terminal portion of the plate.

*d*<sup>1</sup>. Body relatively slender and compressed, not much enlarged at the metathorax, particularly in the male; disk

of the pronotum tectiform,\* the prozona not distinguished from the metazona either by its plane or by any lack of a median carina, which latter is generally marked in color; pronotum fully half as long again as broad; hind femora long and slender; apical tubercle of male abdomen prominent; furcula present as distinctly projecting lobes; terminal segments of female abdomen not abbreviated, the ovipositor fully exerted. . . . *Hesperotettix* Scudder.

*d*<sup>2</sup>. Body relatively short and stout, considerably enlarged at the metathorax even in the male; disk of pronotum generally convex transversely; the prozona slightly and independently tumid with no median carina, thus distinguishing it from the metazona; † hind femora relatively short and stout; apical tubercle of male abdomen not very prominent; furcula scarcely or not apparent; terminal segments of female abdomen abbreviated, the ovipositor only partially exerted. . . . *Aeoloplus* Scudder.

*b*<sup>2</sup>. Subgenital plate of male with no distinct subapical tubercle, but often apically prolonged or tumescent. ‡

*c*<sup>1</sup>. Meso- and metastethium together, in both sexes, no longer or scarcely longer than broad; metastethium narrowing but little posteriorly, so that the portion behind the metasternal lobes is but little narrower than the rest, rarely (in the male) less than three-fourths its width; cerci of male very simple, subconical, straight; ovipositor half concealed.

*Bradynotes* Scudder.

*c*<sup>2</sup>. Meso- and metastethium together, at least in the male and nearly always in both sexes, distinctly longer than the width of the metastethium; the latter rapidly narrowing posteriorly, so that the portion behind the metasternal lobes is not, or is hardly more than, one half the greatest width of the metastethium; cerci of male variable; ovipositor generally fully exerted.

\* This feature is not so apparent in some species as in others.

† This feature is less marked in some species than in others.

‡ There is a minute subapical tubercle in some species of the flabellifer group of *Melanoplus*, but in these the male cerci are exceptionally broad; while in the species of the alternate category (*A*<sup>2</sup> *b*<sup>1</sup>) they are very slender and tapering.



$d^1$ . Interspace between mesosternal lobes of male distinctly transverse,\* as broad or nearly as broad as the lobes themselves; of the female distinctly or strongly transverse, fully as broad as or (and generally) broader than the lobes; metasternal lobes of male generally distinctly distant, occasionally approximate; of the female generally more distant, the interspace in the latter generally as wide as or wider than the frontal costa; tegmina typically abbreviate.

$e^1$ . Face almost vertical; eyes small but prominent and widely distant; pronotum constricted in the middle, with deeply impressed transverse sulci, and the lateral lobes not obliquely truncate apically in front; distinct lateral carinae. . . . . *Dendrotettix* Riley.

$e^2$ . Face a little oblique; eyes rather large, not very prominent and not very distant; pronotum not, or but feebly, constricted in the middle, with generally feebly impressed transverse sulci, and the lateral lobes obliquely truncate apically on the anterior section.

*Podisma* Latreille.

$d^2$ . Interspace between mesosternal lobes generally longer or much longer than broad in the male, almost never in the least broader than long even when the sides of the interspace are posteriorly divergent; generally quadrate in the female, but more variable than in the other sex, sometimes as narrow as there, more often subtransverse, occasionally in some brachypterous forms distinctly transverse; in both sexes always distinctly, generally much, narrower than the lobes (except in the females of the cases just cited, where they are barely narrower); metasternal lobes of male generally attingent or subattingent, rarely only approximate; of the female less distant than in the alternate category ( $A^2 b^2 c^1 d^1$ ), generally approximate, or subapproximate, the interspace generally narrower than the frontal costa; typically the tegmina are completely developed.

\* In many cases the interspace is truncato-cuneiform or broadly clepsydral, in which cases the breadth is to be measured in the middle.

*e*<sup>1</sup>. Face almost vertical or a little oblique, its angle with the fastigium rarely less than 75°; eyes rounded oval, never more (generally less) than half as long again as broad; portion of metasternum lying behind the lobes transverse, more than twice as broad as long; tegmina normally present.

*f*<sup>1</sup>. Fastigium of vertex plane or convex; eyes separated widely, the space between them twice as broad as the frontal costa; pronotum furnished with distinct percurrent lateral carinae; tegmina abbreviate; cerci apically acuminate. . . . *Paratylotropidia* Brunner.

*f*<sup>2</sup>. Fastigium of vertex more or less depressed or with elevated lateral margins; eyes separated narrowly, at most but little further apart than the width of the frontal costa; pronotum with indistinct\* or no lateral carinae; tegmina fully developed or abbreviate; cerci variable, rarely acuminate apically.

*g*<sup>1</sup>. Inferior genicular lobe of hind femora with at least a darker basal spot or transverse band; cerci of male variable, often enlarging apically.

*h*<sup>1</sup>. Dorsum of pronotum rarely or never twice as long as the average breadth, generally only half as long again, even in the male, generally constricted more or less in the middle; antennae even when longest no longer than the hind femora, and only twice as long as the pronotum alone; face rarely as declivent as in *Paroxya*; prozona usually a half longer than the metazona.

*i*<sup>1</sup>. Head not large in proportion to pronotum, nor prominent, but little longer than the prozona, unless the latter is distinctly transverse; pronotum in no way subsellate, nor flaring in front; tegmina, when fully developed, narrow, rarely rather broad, but then very distinctly tapering, more or less tapering in distal half,

\*In a few species they are tolerably distinct.

at a distance from the apex equal to the breadth of the tegmina distinctly narrower than the metazona, the intercalaries and cross-veins of the discoidal area relatively numerous, at least in the apical fourth and usually throughout, the venation in general sharp and clearly defined, the area intercalata distinctly defined by the adjustment of the veins at its distal extremity, the humeral vein straight and apically arcuate, nearly always terminating either on the apical margin or but a short distance before it, running for some distance almost exactly parallel to the costal margin or merging insensibly into it; cerci of male very variable, very rarely styliform, and then the subgenital plate is either exceptionally broad or only moderately narrow, and the apical margin elevated. . . . *Melanoplus* Stål.

*i*². Head large in proportion to pronotum, nearly half as long again as the long prozona; pronotum faintly subsellate, feebly flaring in front to receive the head; tegmina, when fully developed, broad and subequal, hardly tapering in the distal half, at a distance from the apex equal to the breadth of the tegmina as broad as the metazona, the intercalaries and cross-veins of the discoidal area everywhere few, the venation in general loose and ill defined, the area intercalata not distinctly marked by the adjustment of the veins at its distal extremity, the humeral vein broadly sinuous, terminating on the costal margin at least as far before the apex as the breadth of the tegmina, nowhere running closely parallel to that margin nor merging into it; cerci of male styliform, the subgenital plate very narrow, the margin not apically elevated. *Phoetaliotes* Scudder.

*h*<sup>2</sup>. Dorsum of pronotum twice as long as average breadth, at least in the male, with no median constriction; antennae, at least in the male, generally longer than the hind femora and much more than twice as long as the pronotum, generally twice as long as head and pronotum together; face more declivent than in *Melanoplus*; prozona only about a third longer than the metazona.

*Paroxya* Scudder.

*g*<sup>2</sup>. Inferior genicular lobe of hind femora wholly pallid, with no dark basal spot or transverse band; cerci of male conical or subconical or basally bullate, always apically pointed.

*h*<sup>1</sup>. Subgenital plate of male terminating in a pronounced tubercle; prosternal spine slender.

*Poecilotettix* Scudder.

*h*<sup>2</sup>. Subgenital plate of male, even when apically angulate, not furnished with an apical tubercle; prosternal spine stout.

*i*<sup>1</sup>. Relatively heavy bodied; dorsal disk of the prozona tumid independently of the metazona; pronotum distinctly angulate or convex behind; the portion of the metasternum lying behind the lobes laterally extended, reaching to the coxae; tegmina fully developed or abbreviate but overlapping, with many longitudinal veins; cerci of male very stout and bullate on basal half or more; abdomen of female bluntly rounded apically, the posterior segments much abbreviated; ovipositor but slightly exerted. *Oedaleonotus* Scudder.

*i*<sup>2</sup>. Relatively slender bodied; dorsal disk of prozona not tumid independently of the metazona; pronotum truncate posteriorly; portion of metasternum lying behind the lobes laterally abbreviated, much narrower than the width

between coxae; tegmina linear, lateral, distant, with only a few longitudinal veins; abdomen of female tapering regularly to a pointed tip; ovipositor normally exerted.

*Asemoplus* Scudder.

*e*<sup>2</sup>. Face rather strongly oblique, the angle it makes with the fastigium varying about from 55° to 67°; eyes elongate, almost or quite twice as long as broad; portion of metasternum lying behind the lobes subtriangular, not greatly broader than long; tegmina linear and lateral or absent. . . . *Aptenopedes* Scudder.

Of these genera *Melanoplus* is the dominant type and the most prolific in species of any North American Orthoptera, having within our borders alone one hundred and twenty species or more. *Podisma* (*Pezotettix* Burmeister) is the most peculiar in distribution, its eight species being confined to high altitudes or latitudes and to two great districts, one in the west from Alberta to New Mexico, one in the east from New York and Ontario to Maine. The other well endowed genera belong mostly to the western half of the continent, *Aeoloplus* with ten species being found from the Yellowstone to Mexico; *Bradynotes* with seven species confined to the extreme northwest; and *Hesperotettix* with seven species having much the same range as *Aeoloplus* but wider, one species being confined to the eastern half of the continent and found indeed only on or near the Atlantic border. Of the genera with two or three species each, *Aptenopedes* and *Paroxya* are confined to the Gulf or the Gulf and Atlantic States, *Campylacantha* to the plains and prairie region from Nebraska to Texas, *Paraidemona* to southern Texas and *Poecilotettix* to the southern part of the Pacific coast. Of the remaining genera with one species only in the United States, *Gymnosciirtetes* and *Eotettix* are confined to Florida; *Asemoplus* to the extreme northwest; *Hypochlora*, *Dendrotettix*, *Paratylotropidia* and *Phoetaliotes* range between the Rocky Mountains and the Mississippi from various points northerly between Alberta and Texas; *Phaedrotettix*, *Rhabdotettix* and *Cyclocereus* are found in southern Texas;

and *Oedaleonotus* along the Pacific coast. Nine of these twenty-one genera, viz. *Phaedrotettix*, *Rhabdotettix*, *Cyclocercus*, *Paraidemona*, *Campylacantha*, *Hesperotettix*, *Melanoplus*, *Phocetaliotes* and *Poecilotettix*, range southward into Mexico. *Podisma* is also found in the Old World, but the remainder are strictly indigenous types. Dimorphism in respect of the length of the organs of flight is common in many of the genera, but a number of them are uniformly subapterous.

#### Dactyloți.

This is a Central American group of two or three genera, of which only the genus *Dactylotum* Charpentier is represented, by a single species, in our country, occurring from Dakota to Texas along the eastern front of the Rocky Mountains.

## LOCUSTIDAE.

So far as variety of forms is concerned, this family is better represented in the Old World than in the New. Only six of the fifteen recognized subfamilies are known to occur in the United States, and only one other has been found anywhere else in America. At the same time all the American subfamilies are shared by the Old World. The six subfamilies found with us may be distinguished by the following table.

*Subfamilies of Locustidae.*

- A*<sup>1</sup>. Body generally winged ; tarsi more or less depressed.
- b*<sup>1</sup>. Fore tibiae furnished with foramina near the base ; male tegmina, when present, furnished with a tympanum.
- c*<sup>1</sup>. First two joints of tarsi smooth laterally ; hind tibiae with an apical spine on each side. . . . . *Phaneropterinae*.
- c*<sup>2</sup>. First two joints of tarsi longitudinally sulcate laterally ; hind tibiae with an apical spine on outer side only or on neither.
- d*<sup>1</sup>. Fore tibiae without apical spines.
- e*<sup>1</sup>. Fastigium of vertex short, crowded by the prominent antennal scrobes ; pronotum crossed by two distinct transverse sulci. . . . . *Pseudophyllinae*.
- e*<sup>2</sup>. Fastigium of vertex extended and free from the not prominent antennal scrobes ; pronotum without, or with only one, transverse sulcus. . . . . *Conocephulinae*.
- d*<sup>2</sup>. Fore tibiae with an apical spine on the outer side. (Body generally subapterous). . . . . *Decticinae*.
- b*<sup>2</sup>. Fore tibiae without foramina near the base ; male tegmina without a tympanum. . . . . *Gryllacrinae*.
- A*<sup>2</sup>. Body apterous ; tarsi distinctly compressed. . . . . *Stenopelmantinae*.

## PHANEROPTERINAE.

Brunner, in his latest monograph of this subfamily, divides it into forty-three groups. Only five of these are known to occur in the United States, the first standing at a wide distance from

the remainder. Many other groups occur in tropical America; none of ours are peculiar to the United States, and with a single exception, where two genera occur, each of these groups is represented by a single genus.

*Groups of Phaneropterinae.*

*a*<sup>1</sup>. Fore coxae unarmed. . . . . *Odonturæ.*

*a*<sup>2</sup>. Fore coxae bearing a spine.

*b*<sup>1</sup>. Fore and middle tibiae sulcate or plane above, but acutely margined, the outer margin spinulose or unarmed.

*c*<sup>1</sup>. Fastigium of vertex scarcely deflexed, acuminate, no broader than the first antennal joint.

*d*<sup>1</sup>. Tegmina narrow, the hind margin sinuate; genicular lobes of hind femora armed with a long pointed spine; pronotum subsellate. . . . . *Hormiliae.*

*d*<sup>2</sup>. Tegmina broader, the hind margin straight or rounded; genicular lobes obtuse or armed with a short spine; pronotum not at all sellate. . . . . *Scudderiae.*

*c*<sup>2</sup>. Fastigium of vertex deflexed, obtuse, much broader than the first antennal joint; metasternum truncate or with rounded lobes. . . . . *Amblycoryphae.*

*b*<sup>2</sup>. Fore and middle tibiae smooth above, without angular margin, generally unarmed above; metasternum with elongated lobes. . . . . *Microcentra.*

*Odonturæ.*

This group is represented by a single genus, *Dichopetala* Bruner, one species of which occurs in Texas.

*Hormiliae.*

This group is also represented by a single genus, *Arethaea* Stål (*Aegipan* Scudder) which has three or four species in the extreme southern states from Georgia to Arizona.

*Scudderiae.*

Two of the six genera are represented in our fauna.



*Genera of Scudderiae.*

$\alpha^1$ . Fore and middle femora unarmed beneath; the hind femora unarmed beneath or with few spines. . . . . *Scudderia* Stål.

$\alpha^2$ . All the femora spinulose beneath. . . . . *Symmetropleura* Brunner.

*Scudderia* has numerous species widely spread over the country mostly east of the Rocky Mountains. *Symmetropleura* is known only by a single species from Carolina.

**Amblycoryphae.**

*Amblycorypha* Stål is our only genus of this group, with half a dozen species found in the eastern half of the continent.

**Microcentra.**

This group is represented by a single genus, *Microcentrum* Scudder, rich in species, most of which are tropical. Its range in the United States is similar to that of *Amblycorypha*.

**PSEUDOPHYLLINAE.**

This subfamily is barely represented in the United States, as it contains but a single indigenous genus, shared with tropical America.

*Genera of Pseudophyllinae.*

$\alpha^1$ . Body and tegmina testaceous, the latter of only moderate breadth, its anterior ulnar vein terminating not very far before the apex of the tegmina, the veinlets of the costal field distinctly oblique; middle coxae with no basal tubercle. . . . . *Bliastes* Stål.

$\alpha^2$ . Body and tegmina green, the latter of exceptional breadth, its anterior ulnar vein terminating very far before the apex of the tegmina, the veinlets of the costal field transverse; middle coxae with a basal tubercle. . . . . *Cyrtophyllus* Burmeister.

*Bliastes* is not indigenous and has occurred only in the orchid house of the Missouri Botanic Garden, where a single specimen did much damage. *Cyrtophyllus* is the "Katydid" and is widely spread over the United States east of the Rocky Mts., though living at the north only in colonies.

## CONOCEPHALINAE.

Two of the four tribes of this subfamily occur in the United States, but are also found elsewhere, being widely distributed over the globe.

*Tribes of Conocephalinae.*

- a*<sup>1</sup>. Fore and middle femora spined beneath. *Conocephalini*.  
*a*<sup>2</sup>. Fore and middle femora unarmed beneath. *Xiphidiini*.

## Conocephalini.

Redtenbacher recognizes twenty-five genera in this tribe, of which only the four following occur in the United States, all but one of them also found further south.

*Genera of Conocephalini.*

- a*<sup>1</sup>. Prosternum unarmed. *Copiophora* Serville.  
*a*<sup>2</sup>. Prosternum armed with two spines.  
*b*<sup>1</sup>. Tegmina lobiform; wings wanting. *Belocephalus* Scudder.  
*b*<sup>2</sup>. Tegmina and wings perfectly developed.  
*c*<sup>1</sup>. Fastigium of vertex triquetral, flat above. *Pyrgocorypha* Stål.  
*c*<sup>2</sup>. Fastigium of vertex conical, convex above.

*Conocephalus* Thunberg.

*Copiophora* is not indigenous, but has been taken in the green-houses at Washington, D. C. *Belocephalus* is a monotypic genus only known from Florida. A single species of *Pyrgocorypha* is known in eastern America, but of *Conocephalus*, a dominant genus, our species are numerous and widely spread over the country.

## Xiphidiini.

Redtenbacher recognizes three genera in this tribe, with only one, a cosmopolitan genus, occurring in the United States.

*Genera of Niphiidini.*

*a*<sup>1</sup>. Larger and stouter species. Ovipositor short, falcate.

*Orchelimum* Serville.

*a*<sup>2</sup>. Smaller and slenderer species. Ovipositor straight or scarcely curved.

*Niphidium* Serville.

These two genera are united by Redtenbacher, the latest monographer of the group. Both, but especially the latter, are represented by a considerable number of species from all parts of the country.

## DECTICINAE.

This subfamily is fairly well represented in North America, all the groups into which it is divided by Brunner, with but one exception, being represented, and nearly as many genera being found here as in all other countries taken together. The species of the genera are, however, in no case numerous.

*Genera of Decticinae.*

*A*<sup>1</sup>. Prosternum armed with two erect spines.

*b*<sup>1</sup>. Four terminal spines on the lower side of the hind femora, two smaller ones between a larger pair.

*c*<sup>1</sup>. Ovipositor straight.

*d*<sup>1</sup>. Prosternal spines short, obtuse. *Engoniaspis* Brunner.

*d*<sup>2</sup>. Prosternal spines long and slender, subacute.

*Atlanticus* Scudder.

*c*<sup>2</sup>. Ovipositor arcuate.

*d*<sup>1</sup>. Ovipositor curved downward.

*e*<sup>1</sup>. Tegmina longer than the body; posterior process of pronotum brief; humeral sinus in posterior margin of lateral lobes distinct.

*Capnobotes* Scudder.

*e*<sup>2</sup>. Tegmina shorter than pronotum; posterior process of pronotum long; no humeral sinus in posterior margin of lateral lobes.

*Apote* Scudder.

*d*<sup>2</sup>. Ovipositor curved upward. *Orchesticus* Saussure.

*b*<sup>2</sup>. Two terminal spines only (the outer) on the lower side of the hind femora.

*Tropizaspis* Brunner.

*A*<sup>2</sup>. Prosternum unarmed.

*b*<sup>1</sup>. Fore tibiae spined above on both margins.

*c*<sup>1</sup>. Large bulky insects. Tegmina of ♂ almost completely concealed beneath the pronotum; eyes but little larger than antennal scrobes. . . . *Anabrus* Haldeman.

*c*<sup>2</sup>. Relatively small insects. Exposed portion of ♂ tegmina half as large as pronotum; eyes fully twice as large as antennal scrobes. . . . *Cucopteris* Scudder p. p.

*b*<sup>2</sup>. Fore tibiae armed above on outer margin only.

*c*<sup>1</sup>. Fore tibiae with several spines above on outer margin.

*d*<sup>1</sup>. Fore tibiae with three spines above on outer margin.

*e*<sup>1</sup>. Legs short, the hind femora scarcely or not extending beyond abdomen; surface of pronotum granulate.

*Peranabrus* Scudder.

*e*<sup>2</sup>. Legs long, the hind femora extending far beyond abdomen; surface of pronotum smooth.

*f*<sup>1</sup>. Pronotum without distinct lateral carinae, except sometimes posteriorly; a median carina rarely present and then weak.

*g*<sup>1</sup>. Pronotum transversely arched as much on the posterior as on the anterior half.

*h*<sup>1</sup>. Ovipositor straight. *Cucopteris* Scudder p. p.

*h*<sup>2</sup>. Ovipositor arcuate. *Eremopedes* Scudder.

*g*<sup>2</sup>. Pronotum laterally subangulate posteriorly, and often with a slight median carinula.

*Iliostatus* Pietet.

*f*<sup>2</sup>. Pronotum with distinct lateral and median carinae, the latter sometimes weak.

*g*<sup>1</sup>. Lateral carinae of pronotum parallel or subparallel. . . . *Steiroxys* Hermann.

*g*<sup>2</sup>. Lateral carinae approximated in middle of anterior half of pronotum, so as to narrow the dorsum by nearly one half. *Idionotus* Scudder.

*d*<sup>2</sup>. Fore tibiae with four spines above on outer margin.

*e*<sup>1</sup>. Descending lobes of pronotum long, obliquely declivent, the dorsum narrow. *Clinopleura* Scudder.

$e^2$ . Descending lobes of pronotum short, vertical, the dorsum broad. . . . . *Plagiostira* Scudder.

$c^2$ . Fore tibiae with only one spine above on outer margin, situated at apex. . . . . *Ateloplus* Scudder.

About half these genera are represented by only one or two species each; the others have more, but none of them probably much above a dozen. They are almost exclusively found west of the Mississippi and particularly in the elevated plateau of the Cordilleras, but *Atlantius* has three species which are found only east of the Mississippi and especially upon the Atlantic slope, and a single species or two of *Orchesteus*, the most prolific of the genera, occur on the Atlantic slope. *Apote*, *Idiostatus*, *Idionotus* and *Ateloplus* are only known west of the Sierra Nevadas and the same is the case with most of the species of *Cacopteris*. None of our genera occur in the Old World.

#### GRYLLACRINAE.

This subfamily is represented by only a single apterous genus, *Neortus* Brunner, one species of which occurs in Carolina.

#### STENOPELMATINAE.

Brunner has divided this subfamily into two sections (unnamed), which I have here regarded as tribes. Both of them occur with us, but the former only by one of the twenty-four genera into which the section is divided by Brunner, most of them being Old World types.

##### *Tribes of Stenopelmatinae.*

$a^1$ . Tarsi provided with pulvilli; inserting angle of the hind femora situated on the outer side. . . . . *Stenopelmatini*.

$a^2$ . Tarsi without pulvilli; inserting angle of the hind femora situated on the inner side. . . . . *Rhaphidophorini*.

##### *Stenopelmatini.*

Represented only by the uncount genus *Stenopelmatus* Burmeister, three species of which have been described from the

Pacific coast; it ranges over the desert region eastward to the Rocky Mts.; a larger number of species occur south of our border.

### Rhaphidophorini.

Two of the four groups into which this tribe may be divided occur in North America, the other two belonging exclusively to the Old World. One of our groups is peculiar to the United States, and the other much more highly developed here than elsewhere, though shared with South America and the Old World.

#### *Groups of Rhaphidophorini.*

$\alpha^1$ . Hind tibiae supplied above and below with spines of one grade only, on both outer and inner margins. *Tropidischiae*.

$\alpha^2$ . Hind tibiae furnished above with spines of two grades, longer being interspersed with shorter spines (obscure in *Gammarettix*); beneath nearly or quite unarmed, such spines as are present occurring on the middle line only. *Ceuthophili*.

### Tropidischiae.

Its only known genus, *Tropidischia* Scudder, is monotypic and is found in California.

### Ceuthophili.

This group, as developed in the United States, contains six of the nine genera known to belong to it, and all of these are peculiar to the United States, excepting as they may extend southward into Mexico. It is the most representative group of temperate North American Locustidae.

#### *Genera of Ceuthophili.*

$\alpha^1$ . Last palpal joint cleft apically on the under side. Descending lobes of the mesonotum but little longer than those of the pronotum; sides of fore and middle coxae externally laminate, the lamination elevated to a denticle or compressed spine either

mesially or (on middle legs) apically, occasionally (*Hadenocercus*) wanting on middle legs. Fore tibiae not sulcate above; hind tibiae with spines of two grades on both outer and inner margins of upper surface. Outer valves of ovipositor unarmed above before the apex.

*b*<sup>1</sup>. Palpi long. Hind tibiae usually considerably longer than the hind femora. Third hind tarsal joint only half or less than half as long as the second.

*c*<sup>1</sup>. Vertex obscurely bituberculate at apex. Last palpal joint no longer or scarcely longer than the third, and cleft beneath only apically. Middle coxae unarmed. Middle femora with a feeble genicular spine on posterior margin. Hind tibiae with more than four pairs of spurs. First hind tarsal joint almost as long as the others together. Subgenital plate of male triangular and rather deeply and narrowly emarginate. . . . . *Hadenocercus* Scudder.

*c*<sup>2</sup>. Vertex not tuberculate. Last palpal joint distinctly longer than the third, cleft beneath for almost its entire length. Middle coxae spined mesially. Middle femora with a distinct genicular spine on posterior margin. Hind tibiae with only four pairs of spurs. First hind tarsal joint generally a third shorter than the rest combined. Subgenital plate of male ample and broadly emarginate.

*Ceuthophilus* Scudder.

*b*<sup>2</sup>. Palpi short. Hind tibiae shorter or at most but little longer than the hind femora. Third hind tarsal joint hardly shorter than the second, or (in *Daihinia*) wanting. (Lamination of middle coxae produced inferiorly to the semblance of a spine.)

*c*<sup>1</sup>. Third palpal joint as long as fifth, the inferior cleft of the latter extending over only the apical half. Middle femora unarmed at tip or with a very feeble spine. Hind tibiae shorter or at least no longer than the hind femora, with few spines of the second grade on the upper surface, those of the first grade relatively numerous, at least in the ♀, more or less irregularly placed and of unequal length; the calcaria three in number on each side, the uppermost generally a

little the longest and unusually distant from the extreme apex, so as to appear rather as an additional pair of spurs. Subgenital plate of male greatly produced and apically deeply fissured.

$d^1$ . Descending lobes of mesonotum slightly longer than those of pronotum. Last tarsal joint very much shorter than the remaining joints together, the third joint of hind legs normal though but little shorter than the second. Subgenital plate of male ample, rather deeply and broadly emarginate, the sides extending backwards as slender threads. . . . . *Phrixocnemis* Scudder.

$d^2$ . Descending lobes of mesonotum no longer than those of pronotum. Last tarsal joint about as long as the rest together; third tarsal joint of hind legs wanting (as also of fore legs). Subgenital plate of male immensely produced and so deeply fissured as to form two tapering ribbons. . . . . *Daihinia* Haldeman.

$c^2$ . Third palpal joint shorter than the fifth, the inferior cleft of the latter extending its whole length. Middle femora with a genicular spine on posterior side. Hind tibiae slightly longer than the hind femora, with numerous spines of the second grade uniform in length and pretty regularly separated; calcaria three in number on each side, the middle one much longer than the others. (First hind tarsal joint a third shorter than the rest combined.) Subgenital plate of male ample, apically bituberculate. . . . . *Udeopsylla* Scudder.

$\alpha^2$ . (Vertex bituberculate. Palpi short), the last joint apically with no inferior cleft. Descending lobes of mesonotum considerably longer than those of pronotum; sides of fore and middle coxae neither carinate nor spined. (Fore and middle femora unarmed.) Fore tibiae sulcate above; hind tibiae (of the same length as the hind femora) with only one grade\* of spines above on the lateral margins; (calcaria two in number on each side, subequal and not long. Third hind tarsal joint half as long as

\* There are in reality two grades, but the alternating longer and shorter spines are of such slight inequality as easily to be overlooked.



the second. Subgenital plate of male ample, apically broadly and not deeply emarginate); outer valves of ovipositor serrate above before the apex. . . . . *Gammarotettix* Brunner.

The dominant genus is *Ceuthophilus* with about sixty species; it is found in every part of the United States and Canada and extends into Mexico (a few species are confined to northern Mexico). The other genera contain each from one to three species, and excepting *Hadenocercus*, known only from caves and deep wells east of the Mississippi River, occur west of this stream. One species of *Udeopsylla* has been found a little further east, in Illinois and Manitoba. *Gammarotettix* is confined to California.

## GRYLLIDAE.

All six of the subfamilies of Gryllidae occur in the United States, since all are cosmopolitan; no similar case occurs among the Orthoptera. Here also, more than in the other groups, may be seen a nearer correspondence to the European fauna, many more of the genera being identical than is usual in Orthoptera. The following table distinguishes the subfamilies.

*Subfamilies of Gryllidae.*

*A*<sup>1</sup>. Tarsi compressed, the second joint minute, compressed.

*b*<sup>1</sup>. Fore legs fossorial; female without ovipositor; tympanum of male tegmina (when present) without speculum.

*Gryllotalpinae.*

*b*<sup>2</sup>. Fore legs gressorial; female with ovipositor, though it is sometimes rudimentary; tympanum of male tegmina (when present) furnished with a speculum.

*c*<sup>1</sup>. Hind tibiae biserially serratulate but not spined, or, if spined (*Myrmecophila*), then the body is subspherical and the hind femora exceptionally gibbous. *Myrmecophilinae.*

*c*<sup>2</sup>. Hind tibiae biserially spined, the body always subelongate, with relatively slender hind femora.

*d*<sup>1</sup>. Hind tibiae rather stout, armed with stout spines, not serrulate between them. . . . *Gryllinae.*

*d*<sup>2</sup>. Hind tibiae slender, armed with delicate spines, and serrulate between them. . . . *Oecanthinae.*

*A*<sup>2</sup>. Second joint distinct, depressed, cordiform.

*b*<sup>1</sup>. Hind tibiae biserially spinose, not serrate, the apical spurs two in number on the inner side. *Trigonidiinae.*

*b*<sup>2</sup>. Hind tibiae biserially spinose and also serrate, the apical spurs three in number on both sides. . . *Eneopterinae.*

## GRYLLOTALPINAE.

Two of the three tribes of this subfamily are represented with us, the third being an Australian type; both these they share with the Old World, as well as with tropical America.

*Tribes of Gryllotalpinae.*

$\alpha^1$ . Head furnished with two large ocelli; fore tibiae dilated, markedly digitate; hind femora scarcely saltatorial; tarsi 3-jointed. . . . . *Gryllotalpini*.

$\alpha^2$ . Head furnished with three small ocelli; fore tibiae scarcely dilated, 3-4 spined apically; hind femora strongly saltatorial; tarsi uniarticulate or aborted. . . . . *Tridactylini*.

**Gryllotalpini.**

Both the known genera of this tribe occur in the United States.

*Genera of Gryllotalpini.*

$\alpha^1$ . Anterior tibiae tetradactyle. . . . . *Gryllotalpa* Linné.

$\alpha^2$ . Anterior tibiae bidactyle. . . . . *Scapteriscus* Scudder.

*Scapteriscus* occurs only along the margin of the Gulf of Mexico; *Gryllotalpa* everywhere; and each is represented by two or three species.

**Tridactylini.**

One of the two genera of this group, *Tridactylus* Olivier, is a cosmopolitan genus which occurs throughout our territory, represented by several species.

**MYRMECOPHILINAE.**

Only three of the eleven known genera of this family occur in the United States, two of them shared with Europe, one with tropical America.

*Genera of Myrmecophilinae.*

$\alpha^1$ . Antennae stout; hind femora ovate; hind tibiae dilated, with only three or four apical spurs. . . . . *Myrmecophila* Latreille.

$\alpha^2$ . Antennae slender; hind femora elongate; hind tibiae slender, with six apical spurs.

$b^1$ . First joint of hind tarsi sulcate and serrate; pronotum not produced posteriorly, the metanotum exposed.

*Mogosiplistus* Serville.

*b*<sup>2</sup>. First joint of hind tarsi neither sulcate nor serrate ; pronotum produced posteriorly, concealing the metanotum.

*Cycloptilum* Scudder.

*Myrmecophila* is represented by several species and is widely spread, probably occurring wherever there are ants' nests. *Cycloptilum* is represented by one or two species along the borders of the Gulf of Mexico ; and *Mogosiplistus* has just been discovered under bark of trees at Biscayne Bay, Florida, by Mrs. A. T. Slosson.

#### GRYLLINAE.

Only three of the nineteen acknowledged genera of this subfamily occur in the United States, and these genera are all cosmopolitan, or at any rate widely distributed over the globe.

#### *Genera of Gryllinae.*

*a*<sup>1</sup>. Hind tibiae furnished with long, mobile, pilose spines ; first joint of hind tarsi unarmed above or with one row of serrations.

*Nemobius* Serville.

*a*<sup>2</sup>. Hind tibiae armed with strong fixed spines ; first joint of hind tarsi sulcate above, with two rows of serrations.

*b*<sup>1</sup>. Fore tibiae provided with auditory foramina on both faces.

*Gryllus* Linné.

*b*<sup>2</sup>. Fore tibiae with no auditory foramen on inner face.

*Gryllodes* Saussure.

*Nemobius* and *Gryllus* occur everywhere, and have a considerable number of species, especially the former. *Gryllodes* occurs only in the southern portions with two or three species at most. Many of the species in these genera are dimorphic as regards the length of the organs of flight.

#### OECANTHINAE.

This subfamily is represented in the United States by a single genus, *Oecanthus* Serville, out of the twenty known, and this it shares with the Old World and South America. We have half a dozen or more species, spread over the whole country.

## TRIGONIDIINAE.

Half the known genera of this subfamily occur with us, two of which are shared with tropical America, while the third is cosmopolitan.

*Genera of Trigonidiinae.*

*a*<sup>1</sup>. Last palpal joint infundibuliform, apically dilated; lower margin of the facial scutellum transverse or arcuate; basal joint of antennae subdepressed, pretty large; lateral lobes of pronotum subquadrate, the lower margin subhorizontal, subexcised in the middle.

*b*<sup>1</sup>. Foramina of fore tibiae wanting or found on one side only.

*Anaxiphus* Saussure.

*b*<sup>2</sup>. Foramina of fore tibiae present on both sides.

*Cyrtoxiphus* Brunner.

*a*<sup>2</sup>. Last palpal joint dilate, foliaceous; lower margin of the facial scutellum angularly excised in the middle; basal joint of antennae narrow, minute; lateral lobes of pronotum narrowed anteriorly, the lower margin not excised. *Phylloscirtus* Guérin.

These genera are represented by only one or two species each, and these are almost entirely confined to the Southern States, and to the region east of the Rocky Mountains.

## ENEOPTERINAE.

Only four of the twenty-nine known genera of this group occur in the United States, and all are shared with tropical America.

*Genera of Eneopterinae.*

*a*<sup>1</sup>. Tegmina of male provided with a stridulatory tympanum.

*b*<sup>1</sup>. At least three or four oblique veins traverse the median area of the tympanum of the male tegmina, reaching to its posterior portion. . . . *Pareocanthus* Saussure.

*b*<sup>2</sup>. No more than two oblique veins traverse the median area of the tympanum of the male tegmina, and are found in the proximal portion only.

*c*<sup>1</sup>. Fore tibiae with auditory foramen on the inner face only.

*Apithis* Uhler.

*c*<sup>2</sup>. Fore tibiae with auditory foramina on both faces.

*Orocharis* Uhler.

*a*<sup>2</sup>. Tegmina of male like those of the female without tympanum.

*Metrypa* Brunner.

All these genera, which have only one or two species each, are confined or nearly confined to the Southern States, *Apithis* and *Orocharis* ranging much the furthest north. They are only known from east of the Rocky Mountains.

## BIBLIOGRAPHICAL NOTES.

The modern system of Orthoptera was first laid down in general treatises by Burmeister and Serville (quoted below), but these works are now of relatively small value, since the study of each family has been much more fully developed independently by various later writers, to whom, when American groups are treated, reference is made farther on. The latest general system of Orthoptera — a sketch only — is to be found in Brunner's *Révision du système des Orthoptères* (1893). Other general works that may be consulted for North American Orthoptera are Scudder's *Catalogue of the earlier described species* (1868), and Grovers' *Illustrations* (1872).

For tables for the determination of the families of Orthoptera, see Burmeister's *Handbuch der entomologie*, ii, 468 (1838); Serville's *Orthoptères* (*Suites à Buffon*), 9, 293 (1839); Fieber's *Synopsis der europäischen Orthopteren*, 2-3 (1853); Fischer's *Orthoptera europaea*, 4-5 (1853); Scudder, in *Bost. journ. nat. hist.*, vii, 413 (1862), and in *Psyche*, i, 169-70 (1876); Thomas' *Key to Illinois Orthoptera*, 1 (1875), and the same in *Rep. ins. Ill.*, ix, 82 (1880); Brunner's *Prodromus der europäischen Orthopteren*, 1 (1882); Comstock's *Introduction to entomology*, 89-90 (1888); Fernald's *Orthoptera of New England*, 12 (1888); Finot's *Insectes Orthoptères*, 59 (1890); Sharp, in the *Cambridge natural history*, v, 201 (1895); and Comstock's *Manual for the study of insects*, 105 (1895).

## FORFICULIDAE.

Besides the treatment of this family in the general works on Orthoptera, some of the principal of which are mentioned above, see Serville, *Rev. méth. Orthopt.*, 2-3 (1831); de Haan, *Bijdr. kenn. Orthopt.*, 238-39 (1842); Dohrn, *Monogr. Dermapt.* (*Stett. ent. zeit.*, xxiv, 35-66, 309-322; xxv, 285-96, 417-29; xxvi, 68-99; xxviii, 341-43 — 1863-67); numerous papers by de

Bormans, and especially his *Étude sur quelques Forficulaires* (Ann. soc. ent. Belg., xxvii, 59–90, 1893), where a table of genera is added; and his treatment of these insects in the Biol. centr. amer., Orthopt., 1–12 (1893); Brunner, Prodr. eur. Orthopt., 4, for a table of the European genera (1882); Scudder, Proc. Bost. soc. nat. hist., xviii, 287–332 (1876); also his Synoptical table of U. S. Forficulariae (Psyche, i, 177–78 — 1876); and his Synopsis of the North American species (Bull. U. S. geol. surv. terr., ii, 249–60, 1876); and finally Kirby's Revision of the Forficulidae (Journ. Linn. soc. Lond., Zool., xxiii, 502–31, 1890), which also contains a table of the genera.

*Anisolabis*. — (Table of species) Scudder, Bull. U. S. geol. surv. terr., ii, 251 (1876).

*Sphongophora*. — (Table of species) Scudder, Bull. U. S. geol. surv. terr., ii, 252 (1876).

*Labia*. — (Tables of species) Scudder, Psyche, i, 178 (1876); Id., Bull. U. S. geol. surv. terr., ii, 257 (1876).

*Forficula*. — (Tables of American species) Scudder, Psyche, i, 177 (1876); Id., Bull. U. S. geol. surv. terr., ii, 254 (1876).

## BLATTIDAE.

For the general treatment of this family and tables for its subdivision, to which special reference is made, see, in chronological order and with special reference to North American forms, Burmeister's Handb. ent., ii, 481–82 (1838); Serville's Orthoptères, 66 (1839); de Haan, Bijdr. kenn. Orthopt., 48 (1842); Fieber, Syn. eur. Orthopt., 4–6 (1853); Fischer, Orthopt. eur., 91 (1853); Scudder, Bost. journ. nat. hist., vii, 413 — for New England genera (1862); Saussure, Orthopt. Amér. moy., 46, 47–49, 145, 219 (1864–65); Brunner, Syst. Blatt., 46–50 (1865); Saussure, Mél. orthopt., i (1869); his Miss. scient. Mex., Orthopt. (1870); Stål, Rech. syst. Blatt. 6–7 (1874); Thomas, Key Ill. Orthopt., (1875); Brunner, Prodr. eur. Orthopt., 29–30 — for the European genera (1882); Fernald, Orthopt. N. Engl., 50 — N. Engl. genera only (1888); Brunner, Rév. syst. Orthopt., 10–12 (1893);



Saussure-Zehntner, Biol. centr. amer., Orthopt., 14-15 (1893); and Sharp, Cambr. nat. hist., v, 240-41 (1895).

*BLATTINAE*.—(Tables of genera) Brunner, Syst. Blatt., 46-47 (1865); Id., Rév. syst. Orthopt., 13-14 (1893); Saussure-Zehntner, Biol. centr. amer., Orthopt., 30-31 (1893).

*Thyrsocera*.—(Tables of species) Brunner, Syst. Blatt., 116-17 (1865); Saussure, Miss. scient. Mex., Orthopt., 48 (1870); Brunner, Rév. syst. Orthopt., 21 (1893).

*Ischnoptera*.—(Tables of species) Brunner, Syst. Blatt., 128-29 (1865); Saussure, Miss. scient. Mex., Orthopt., 53 (1870); Saussure-Zehntner, Biol. centr. amer., Orthopt., 35-36 (1893).

*Phyllodromia*.—(Tables of species) Saussure, Orthopt. Amér. moy., 93-94 (1864-65); Brunner, Syst. Blatt., 89-90 (1865); Saussure, Miss. scient. Mex., Orthopt., 27 (1870); Brunner, Rév. syst. Orthopt., 14-15 (1893); Saussure-Zehntner, Biol. centr. amer., Orthopt., 41-42 (1893).

*Ceratinoptera*.—(Tables of species) Brunner, Syst. Blatt., 76 (1865); Saussure-Zehntner, Biol. centr. amer., Orthopt., 48 (1893).

*Temnopteryx*.—(Tables of species) Brunner, Syst. Blatt., 84 (1865); Saussure, Miss. scient. Mex., Orthopt., 23 (1870); Saussure-Zehntner, Biol. centr. amer., Orthopt., 50-52 (1893).

*Loboptera*.—(Table of species) Brunner, Syst. Blatt., 80 (1865).

*NYCTOBORINAE*.—No table of genera has ever been published.

*Nyctobora*.—(Tables of species) Brunner, Syst. Blatt., 144 (1865); Saussure-Zehntner, Biol. centr. amer., Orthopt., 55 (1893).

*PERIPLANETINAE*.—(Tables of genera) Brunner, Syst. Blatt., 48, 202-3 (1865); Stål, Rech. syst. Blatt., 12-14 (1874); Brunner, Rév. syst. Orthopt., 33-35 (1893); Saussure-Zehntner, Biol. centr. amer., Orthopt., 69-70 (1893).

*Eurycotis*.—(Table of species) Saussure-Zehntner, Biol. centr. amer., Orthopt., 70 (1893).

*Pelmatosilpha*.—(Table of species) Saussure-Zehntner, Biol. centr. amer., Orthopt., 72 (1893).

*Periplaneta*.—(Table of species) Saussure-Zehntner, Biol. centr. amer., Orthopt., 73-74 (1893).

PANCHLORINAE.—(Tables of genera) Brunner, Syst. Blatt., 48-49 (1865); Stål, Rech. syst. Blatt., 16-17 (1874); Saussure-Zehntner, Biol. centr. amer., Orthopt., 88-89 (1893).

*Panchlora*.—(Tables of species) Saussure, Orthopt. Amér. moy., 187-202, passim (1864-65); Brunner, Syst. Blatt., 271-72 (1865); Saussure, Miss. scient. Mex., Orthopt., 101 (1870); Saussure-Zehntner, Biol. centr. amer., Orthopt., 91-93 (1893).

CORYDINAE.—(Table of genera) Saussure-Zehntner, Biol. centr. amer., Orthopt., 104-105 (1893).

*Homocogamia*.—(Table of species) Saussure-Zehntner, Biol. centr. amer., Orthopt., 105-106 (1893).

PLECTOPTERINAE.—(Table of genera) Brunner, Syst. Blatt., 48 (1865).

*Chorisoneura*.—(Table of species) Brunner, Syst. Blatt. 256 (1865).

PANESTHINAE.—(Tables of genera) Brunner, Syst. Blatt., 50 (1865); Id., Rév. syst. Orthopt., 45-46 (1893); Saussure, Rev. suisse zool., iii, 301-303 (1895).

## MANTIDAE.

Tables for the determinations of the subfamilies (in some instances of the genera only) of Mantidae will be found in Burmeister, Handb. ent., ii, 523-24 (1838); Serville, Orthoptères, 140 (1839); de Haan, Bijdr. kenn. Orthopt., 64-65 (1842); Fischer, Orthopt. eur., 123 (1853); Saussure, Miss. scient. Mex., Orthopt., 229-30 (1870); Id., Mém. orthopt., i, 157 (1870); Id., Mant. amér., 7 (1871); Id., Mitth. schweiz. ent. gesellsch., iii, 51 (1872); Stål, Syst. Mant., 5-7 (1877); Brunner, Rév. syst. Orthopt., 57-58 (1893); Saussure-Zehntner, Biol. centr. amer., Orthopt., 124 (1894); Sharp, Cambr. nat. hist., v, 259 (1895); and Scudder, Can. ent., xxviii, 207-209 (1896). For a general discussion of the classification, see also Stål, Rech. syst. Mant. (1873).

**MANTINAE.**—(Tables of genera and higher groups) Saussure, *Mél. orthopt.*, i, 175–77 (1870); *Id.*, *Mant. amér.*, 27–30 (1871); *Id.*, *Miss. scient. Mex.*, *Orthopt.*, 233–36 (1872); *Id.*, *Mitth. schweiz. ent. gesellsch.*, iii, 55–58, 224–27, 234–35 (1872); *Id.*, *Mél. orthopt.*, ii, 19–21 (1872); Stål, *Syst. Mant.*, 18–45 (1877); Brunner, *Prodr. eur. Orthopt.*, 57 — for European genera (1882); *Id.*, *Rév. syst. Orthopt.*, 60–64 (1893); Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 127–130, 162 (1894); Scudder, *Can. ent.*, xxviii, 207–209 (1896).

*Phasmomantis.*—(Table of species) Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 149 (1894).

*Stagmomantis.*—(Tables of species) Saussure, *Mant. amér.*, 44 (1871); *Id.*, *Miss. scient. Mex.*, *Orthopt.*, 243–44 (1872); Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 140–41 (1894).

*Brunneria.*—(Table of species) Saussure, *Mant. amér.*, 133 (1871).

*Oligonyx.*—(Tables of species) Saussure, *Mant. amér.*, 119 (1871); *Id.*, *Miss. scient. Mex.*, *Orthopt.*, 273 (1872); Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 172 (1894).

*Thesprotia.*—(Table of species) Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 170 (1894).

**VATINAE.**—(Tables of genera) Saussure, *Mant. amér.*, 156 (1871); *Id.*, *Mél. orthopt.*, ii, 73 (1872); *Id.*, *Miss. scient. Mex.*, *Orthopt.*, 286 (1872); *Id.*, *Mitth. schweiz. ent. gesellsch.*, iii, 53 (1872); Brunner, *Rév. syst. Orthopt.*, 73–75 (1893); Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 184 (1894).

*Theoclytes.*—(Tables of species) Saussure, *Mant. amér.*, 172 (1871); *Id.*, *Miss. scient. Mex.*, *Orthopt.*, 292 (1872); Saussure-Zehntner, *Biol. centr. amér.*, *Orthopt.*, 190–91 (1894).

## PHASMIDAE.

For the division of this family into subfamilies or genera, see Burmeister, *Handb. ent.*, ii, 560 (1838); Serville, *Orthoptères*, 220–222 (1839); de Haan, *Bijdr. kenn. Orthopt.*, 107–108 (1842); Stål, *Rech. syst. Phasm.*, 13–16 (1875); *Id.*, *Rec. Orthopt.*, iii,

4-62 (1875); Id., Obs. orthopt., i, 5-21 (1875); Brunner, Rév. syst. Orthopt., 79-81 (1893); Sharp, Cambr. nat. hist., v, 277-78 (1895); and Scudder, Can. ent., xxvii, 29-30 (1895), the last for the United States genera only.

BACUNCULINAE.—(Table of genera) Brunner, Rév. syst. Orthopt., 82 (1893).

*Sermyle*.—(Table of species) Stål, Rec. Orthopt., iii, 76-77 (1875).

ANISOMORPHINAE.—(Table of genera) Brunner, Rév. Syst. Orthopt., 98 (1893).

### ACRIDIIDAE.

Tables for the distribution of this family into subordinate groups will be found in Burmeister, Handb. ent., ii, 602-603 (1838); Serville, Orthoptères, 565-70 (1839); de Haan, Bijdr. kenn. Orthopt., 144-46 (1842); Fieber, Syn. eur. Orthopt., 8-37, passim (1853); Fischer, Orthopt. eur., 295-98 — for European genera (1853); Scudder, Bost. journ. nat. hist., vii, 414 — N. Engl. genera (1862); Stål, Rec. Orthopt., i, 1-8 (1873); Thomas, Acrid. N. A., 49-51 (1873); Id., Key Ill. Orthopt., 2-3 — for Illinois genera (1875); Stål, Obs. orthopt., ii, 8-10 (1876); Thomas, Rep. ins. Ill., ix, 83-92 — for Illinois genera (1880); Brunner, Prodr. eur. Orthopt., 83-87 — for European genera (1882); Comstock, Intr. ent., 100-101 (1888); Fernald, Orthopt. N. Engl. 28 — N. Engl. genera (1888); Brunner, Rév. syst. Orthopt., 102-103 (1893); Sharp, Cambr. nat. hist., v, 309-10 (1895); Morse, Psyche, vii, 325 — for N. Engl. groups only (1896); McNeill, Proc. Dav. acad. nat. sc., vi, 180 — American subfamilies only (1897).

TETTIGINAE. — (Table of species) de Haan, Bijdr. kenn. Orthopt., 166-67 (1842). (Tables of genera) Thomas, Acrid. N. A., 182 (1873); Stål, Obs. orthopt., ii, 47 (1876); Bolivar, Ess. Tettig., 17-22 (1887); Comstock, Intr. ent., 112 (1888); Fernald, Orthopt. N. Engl., 46 — N. E. genera only (1888); Morse, Psyche, vii, 149 — for N. Engl. genera only (1894).

*Tettigiae*. — (Table of genera) Bolivar, Ess. Tettig., 21 (1887).

*Tettix*. — (Tables of species) Bolivar, Ess. Tettig., 83–85 (1887); Fernald, Orthopt. N. Engl., 46 — N. Engl. species only (1888); Morse, Psyche, vii, 149 — N. Engl. species only (1894).

*Paratettix*. — (Tables of species) Bolivar, Ess. Tettig., 96–98 (1887).

*Batrachideae*. — (Table of genera) Bolivar, Ess. Tettig., 21–22 (1887).

*Tettigidea*. — (Tables of species) Bolivar, Ess. Tettig., 121–22 (1887); Fernald, Orthopt. N. Engl., 47 — N. Engl. species (1888); Morse, Psyche, vii, 149 — N. Engl. species only (1894).

*TRYXALINAE*. — (Tables of genera) Thomas, Acrid. N. A., 57 (1873); Stål, Rec. Orthopt., i, 87–94 (1873); Id., Obs. orthopt., ii, 19–23 (1876); Id., ibid., 41–43 — N. A. genera only (1876); Fernald, Orthopt. N. Engl., 34 — N. Engl. genera only (1888); Brunner, Rév. syst. Orthopt., 118–123 (1893); Morse, Psyche, vii, 325–327 — N. Engl. species only (1896); McNeill, Proc. Dav. acad. nat. sc., vi, 195–198 (1897).

*Achurum*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 202 (1897).

*Acrocara*. — (Table of species) Scudder, Psyche, v, 437 (1890).

*Mermiria*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 204–205 (1897).

*Eritettix*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 218 (1897).

*Syrbula*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 221–222 (1897).

*Amphitornus*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 224 (1897).

*Amblytropidia*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 226–227 (1897).

*Chloealtis*. — (Tables of species) Thomas, Acrid. N. A., 74 (1873); Fernald, Orthopt. N. Engl., 35 (1888); Morse, Psyche, vii, 327 (1876); McNeill, Proc. Dav. acad. nat. sc., vi, 228 (1897).

*Dichromorpha*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 231 (1897).

*Orphula*. — (Tables of species) Morse, Psyche, vii, 326–327 — N. Engl. species only (1896); McNeill, Proc. Dav. acad. nat. sc., vi, 234–235 (1897).

*Alpha*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 246 (1897).

*Boopedon*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 250 (1897).

*Plectrotettix*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 252 (1897).

*Mecostethus*. — (Tables of species) Morse, Psyche, vii, 327 (1896); McNeill, Proc. Dav. acad. nat. sc., vi, 254 (1897).

*Stenobothrus*. — (Tables of species) Thomas, Acrid. N. A., 81 (1873); Id., Key Ill. Orthopt., 3 — Ill. species only (1875); McNeill, Proc. Dav. acad. nat. sc., vi, 260 (1897).

*Gomphocerus*. — (Tables of species) Stål, Rec. Orthopt., i, 108–111 (1873); Bolivar, Anal. orthopt., 3–7 (1878); McNeill, Proc. Dav. acad. nat. sc., vi, 265 (1897).

*Ageneotettix*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 268 (1897).

*Stirapleura*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 270–271 (1897).

*Psoloessa*. — (Table of species) McNeill, Proc. Dav. acad. nat. sc., vi, 273 (1897).

OEDIPODINAE. — (Table of species) de Haan, Bijdr. kenn. Orthopt., 159–61 (1842). (Tables of genera and tribes) Thomas, Acrid. N. A., 71–72 (1873); Stål, Rec. Orthopt., i, 113–119 (1873); Id., Obs. orthopt., ii, 24–28, 43–47 (1873); Thomas, Key Ill. Orthopt., — Illinois genera only (1875); Scudder, Rep. Wheeler's surv., 1876, 508 — Western genera only (1877); Saussure, Prodr. Oedip., 41–63 (1884); Id., Add. prodr. Oedip., 14 (1888); Comstock, Introd. ent, 103 — Eastern genera only (1888); Fernald, Orthopt. N. Engl., 38–39 — N. E. genera only (1888); Morse, Psyche, viii, 35–37 — N. Engl. genera only (1897).

*Oedipodini*. — (Tables of genera) Saussure, Prodr. Oedip., 41–61, 154, 192 (1884); Id., Add. prodr. Oedip., 14–24 (1888).

*Arphia*. — (Table of species) Saussure, Prodr. Oedip., 65–66 (1884).

*Chortophaga*. — (Tables of species) Scudder, Proc. Bost. soc. nat. hist., xvii, 479 (1875); Saussure, Prodr. Oedip., 72 (1884).

*Chimarocephala*. — (Table of species) Saussure, Prodr. Oedip., 75 (1884).

*Encoptolophus*. — (Tables of species) Scudder, Proc. Bost. soc. nat. hist., xvii, 480 (1875); Saussure, Prodr. Oedip., 77 (1884).

*Hippiscus*. — (Tables of species) Saussure, Prodr. Oedip., 82–84, 89–90 (1884); Scudder, Psyche, vi, 266–74 (1892).

*Dissosteira*. — (Table of species) Saussure, Prodr. Oedip., 134–35 (1884).

*Spharagemon*. — (Tables of species) Scudder, Proc. Bost. soc. nat. hist., xvii, 468 (1875); Saussure, Prodr. Oedip., 135 (1884); Fernald, Orthopt. N. Engl. 43 — N. E. species (1888); Morse, Psyche, vii, 290, 292, 295 — N. Engl. species only (1895).

*Scirtettica*. — (Table of species) Saussure, Prodr. Oedip., 135 (1884).

*Lactista*. — (Table of species) Saussure, Prodr. Oedip., 142–43 (1884).

*Tomonotus*. — (Table of species) Saussure, Prodr. Oedip., 97 (1884).

*Derotnema*. — (Table of species) Saussure, Prodr. Oedip., 155 (1884).

*Mestobregma*. — (Tables of species) Saussure, Prodr. Oedip., 160–61 (1884); Id., Add. prodr. Oedip., 58–59 (1888).

*Conozoa*. — (Tables of species) Saussure, Prodr. Oedip., 165 (1884); Id., Add. prodr. Oedip., 60–61 (1888).

*Trimerotropis*. — (Tables of species) Saussure, Prodr. Oedip., 167–68 (1884); Id., Add. prodr. Oedip., 63 (1888).

*Circotettix*. — (Table of species) Saussure, Prodr. Oedip., 175 (1884).

*Heliasus*. — (Table of species) Saussure, Prodr. Oedip., 212–13 (1884).

*Eremobiini*. — (Tables of genera) Saussure, Prodr. Oedip., 61-63 (1884); Id., Add. prodr. Oedip., 122-24 (1888).

*Brachystola*. — (Table of species) Saussure, Prodr. Oedip., 163 (1884).

ACRIDINAE. — (Tables of genera and higher groups) Thomas, Acrid. N. A., 144-45 (1873); Stål, Rec. Orthopt., i, 26-44 (1873); Id., Obs. orthopt., ii, 10-19 (1876); Id., ibid., ii, 37-41 — N. A. genera (1876); Id., Syst. Acrid., 5-53 (1878); Comstock, Introd. ent., 106 — the commoner N. A. genera (1888); Fernald, Orthopt. N. Engl., 18 — N. Engl. genera (1888); Brunner, Rév. syst. Orthopt., 131-51 (1893).

*Dictyophorus*. — (List of species) Pictet-Saussure, Catal. Acrid., i, 17 (1887).

*Rhomalea*. — (Table and List of species) Pictet-Saussure, Catal. Acrid., i, 18-20 (1887).

*Tropidacris*. — (Tables and List of species) Stål, Rec. Orthopt., i, 48-49 (1873); Pictet-Saussure, Catal. Acrid., i, 28-29 (1887).

*Schistocerca*. — (Tables of species) Stål, Rec. Orthopt., i, 64-67 (1873); Thomas, Acrid. N. A., 169 (1873); Id., Key Ill. Orthopt., 3 — Illinois species only (1875).

*Melanopli*. — (Tables of genera) Stål, Obs. orthopt., iii, 3-5 (1878); Brunner, Rév. syst. Orthopt., 144-47 (1893); Scudder, Psyche, vii, 367-68 — N. E. genera only (1896); Id., Proc. amer. acad. arts sc., xxxii, 195-204 (1897). A monograph on this group, with tables and descriptions of all the N. A. genera and species will shortly be published by the U. S. National Museum.

*Podisma*. — (Tables of species) Thomas, Acrid. N. A., 145-46 (1873); Id., Key Ill. Orthopt., 3 — Illinois species only (1875); Stål, Obs. orthopt., iii, 14-15 (1878).

*Melanoplus*. — (Tables of species) Thomas, Ann. rep. U. S. geol. surv. terr., v, 449-50 (1872); Id., Acrid. N. A., 158 (1873); Id., Key Ill. Orthopt., 3 — Illinois species only (1875); Scudder, Proc. Bost. soc. nat. hist., xix, 322-24 — N. Engl. species only (1878); Id., ibid, 327-28 — Western species only (1878); Stål, Obs. orthopt., iii, 13-14 (1878); Comstock, Introd. ent., 108, commoner species only (1888); Fernald, Orthopt. N. Engl., 31 —



N. Engl. species only (1888); Scudder, Psyche, vii, 368-70 — N. Engl. species only (1896); Scudder, Proc. amer. philos. soc., xxxvi, (1897).

Tables of these and all the other genera of Melanopli having more than one species will be found in the forthcoming memoir referred to under Melanopli.

## LOCUSTIDAE.

Tables more or less complete for determining the higher groups of the genera will be found in Burmeister, Handb. ent., ii, 673-75 (1838); Serville, Orthoptères, 376-83 (1839); de Haan, Bijdr., kenn. Orthopt., 180-82 (1842); Fieber, Syn. eur. Orthopt. 38-62, passim (1853); Fischer, Orthopt. eur., 197-99 (1853); Scudder, Bost. journ. nat. hist., vii, 414—N. Engl. genera only (1862); Stål, Rec. Orthopt., ii, 1-4 (1874); Thomas, Key Ill. Orthopt., 2—Illinois genera only (1875); Brunner, Monogr. Phaneropt., 10-12 (1878); Id., Prodr. eur. Orthopt., 245-49—European groups only (1882); Comstock, Introd. ent., 113—northeastern U. S. genera only (1888); Fernald, Orthopt. N. Engl., 18—N. Engl. genera only (1888); Brunner, Rév. syst. Orthopt., 165-66 (1893); Sharp, Cambr. nat. hist., v, 328-29 (1895).

PHANEROPTERINAE.—(Tables of genera and higher groups) Stål, Öfv. vet. akad. förh., xxx, 39-42 (1873); Id., Rec. Orthopt., ii, 8-22 (1874); Brunner, Monogr. Phaneropt., 12-32 (1878); Id., Add. monogr. Phaneropt., 3-24 (1891).

Odonturæ.—(Tables of genera) Brunner, Monogr. Phaneropt., 12-13 (1878); Id., Add. monogr. Phaneropt., 3-4 (1891).

*Dichopetala*.—(Table of species) Brunner, Monogr. Phaneropt., 76 (1878).

Hormiliae.—(Tables of genera) Brunner, Monogr. Phaneropt., 24 (1878); Id., Add. monogr. Phaneropt., 16 (1891).

*Arethaea*.—(Table of species) Brunner, Monogr. Phaneropt., 235 (1878).

*Scudderia*.—(Tables of genera) Brunner, Monogr. Phaneropt., 25 (1878); Id., Add. monogr. Phaneropt., 16–17 (1891).

*Scudderia*.—(Table of species) Brunner, Monogr. Phaneropt., 237–38 (1878).

*Symmetoppleura*.—(Table of species) Brunner, Monogr. Phaneropt., 245–46 (1878).

*Amblycorypha*.—(Tables of genera) Brunner, Monogr. Phaneropt., 26–27 (1878); Id., Add. monogr. Phaneropt., 19 (1891).

*Amblycorypha*.—(Table of species) Brunner, Monogr. Phaneropt., 265–66 (1878).

*Microcentra*.—(Tables of genera) Brunner, Monogr. Phaneropt., 29–31 (1878); Id., Add. monogr. Phaneropt., 22–23 (1891).

*Microcentrum*.—(Tables of species) Brunner, Monogr. Phaneropt., 334–35 (1878); Id., Add. monogr. Phaneropt., 179–80 (1891).

PSEUDOPHYLLINAE.—(Tables of genera and higher groups) Stål, Öfv. vet. akad. förh., xxx, 44–48 (1873); Id., Rec. Orthopt., ii, 48–67 (1874); Brunner, Monogr. Pseudoph., 9–22 (1895).

*Bliastes*.—(Table of species) Brunner, Monogr. Pseudoph., 181–83 (1895).

*Cyrtophyllus*.—(Table of species) Brunner, Monogr. Pseudoph., 239 (1895).

CONOCEPHALINAE.—(Tables of genera and higher groups) Stål, Öfv. vet. akad. förh., xxx, 50 (1873); Id., Rec. Orthopt., ii, 96–104 (1874); Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 327–33 (1891).

Conocephalini.—(Table of species) de Haan, Bijdr. kenn. Orthopt., 211–12 (1842). (Table of genera) Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 328–30 (1891).

*Copiophora*.—(Tables of species) Stål, Rec. Orthopt., ii, 104–105 (1874); Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 340 (1891).

*Pyrgocorypha*.—(Table of species) Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 372 (1891).

*Conocephalus*.—(Tables of species) Stål, Rec. Orthopt. ii, 108–

110 (1874); Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 378-86 (1891).

*Xiphidiini*.—(Tables of genera) Stål, Rec. Orthopt., ii, 111-13 (1874); Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 333 (1891). (Table of species) Fernald, Orthopt. N. Engl., 24—N. Engl. species only (1888).

*Orchelimum*.—(Table of species) Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 494-95 (1891).

*Xiphidium*.—(Table of species) Redtenbacher, Verh. zool.-bot. gesellsch. Wien, xli, 495-99 (1891).

DECTICINAE.—(Tables of genera) Herman, Verh. zool.-bot. gesellsch. Wien, xxiv, 197-201 (1874); Brunner, Rév. syst. Orthopt., 185-88 (1893); Scudder, Can. ent., xxvi, 177-79 (1894).

*Atlanticus*.—(Table of species) Scudder, Can. ent., xxvi, 179-80 (1894).

*Cupnobotes*.—(Table of species) Scudder, Can. ent., xxix, 73-74 (1897).

*Steiroxys*.—(Table of species) Scudder, Can. ent., xxvi, 182 (1894).

STENOPELMATINAE.—(Tables of genera and higher groups) Stål, Obs. orthopt., ii, 49-53 (1876); Brunner, Monogr. Stenop., 9-13 (1888).

*Stenopelmatini*.—(Table of genera) Brunner, Monogr. Stenop., 9 (1888).

*Stenopelmatus*.—(Table of species) Brunner, Monogr. Stenop., 14-15 (1888).

*Rhaphidophorini*.—(Table of genera) Brunner, Monogr. Stenop., 12-13 (1888).

*Ceuthophili*.—(Tables of genera) Brunner, Monogr. Stenop., 12-13 (1888); Scudder, Proc. amer. acad. arts sc., xxx, 20-21 (1894).

*Hudenoccus*.—(Table of species) Scudder, Proc. amer. acad. arts sc., xxx, 22 (1894).

*Ceuthophilus*.—(Tables of species) Brunner, Monogr. Stenop., 61-62 (1888); Scudder, Proc. amer. acad. arts sc., xxx, 24-30 (1894).

*Phrixocnemis*.—(Table of species) Scudder, Proc. amer. acad. arts sc., xxx, 103 (1894).

*Daihinia*.—(Table of species) Scudder, Proc. amer. acad. arts sc., xxx, 108 (1894).

*Udeopsylla*.—(Table of species) Scudder, Proc. amer. acad. arts sc., xxx, 109 (1894).

## GRYLLIDAE.

Tables of genera and higher groups will be found in Burmeister, Handb. ent., ii, 729 (1838); Serville, Orthoptères, 298–99 (1839); de Haan, Bijdr. kenn. Orthopt., 227–28 (1842); Fieber, Syn. eur. Orthopt., 62–69, passim—the European genera (1853); Fischer, Orthopt. eur., 151–52—European genera (1853); Scudder, Bost. journ. nat. hist., vii, 413–14—N. Engl. genera only (1862); Saussure, Miss. scient. Mex., Orthopt. 332 (1874); Thomas, Key Ill. Orthopt., 2,—Illinois genera (1875); Brunner, Mitth. schweiz. ent. gesellsch., iv, 164–67 (1877); Saussure, Mél. orthopt., ii, 185 (1877); Brunner, Prodr. eur. Orthopt., 419–20—European genera (1882); Comstock, Introd. ent. 120—common American genera (1888); Fernald, Orthopt. N. Engl., 12—N. Engl. genera (1888); Sharp, Cambr. nat. hist., v, 340 (1895); Saussure, Biol. centr. amer., Orthopt., 198–99 (1894).

GRYLLOTALPINAE. — (Tables of genera) Saussure, Miss. scient. Mex., Orthopt., 334 (1874); Id., Mél. orthopt., ii, 187 (1877); Brunner, Mitth. schweiz. ent. gesellsch., 166–67 (1877).

*Gryllotalpa*.—(Tables of species) de Haan, Bijdr. kenn. Orthopt., 237 (1842); Scudder, Mem. Peab. acad. sc., i, 16 (1869); Saussure, Miss. scient. Mex., Orthopt., 341 (1874); Id., Mél. orthopt., ii, 192–93 (1877).

*Scapteriscus*.—(Tables of species) Scudder, Mem. Peab. acad. sc., i, 7 (1869); Saussure, Miss. scient. Mex., Orthopt., 337 (1874).

*Triductylus*.—(Tables of species) de Haan, Bijdr. kenn. Orthopt., 237–38 (1842); Saussure, Miss. scient. Mex., Orthopt.,

351 (1874); Id., Mél. orthopt., ii, 214-15 (1877); Id., Biol. centr. amer., Orthopt., 204 (1896); Id., Rev. suisse zool., iv, 30 (1897).

MYRMECOPHILINAE.—(Tables of genera) Saussure, Miss. scient. Mex., Orthopt., 423 (1874); Id., Mél. orthopt., ii, 456-57 (1877). Brunner, Mitth. schweiz. ent. gesellsch., iv, 167 (1877).

*Cycloptilum*.—(Table of species) Saussure, Miss. scient. Mex., Orthopt., 426 (1874).

GRYLLINAE.—(Tables of genera) Saussure, Miss. scient. Mex., Orthopt., 380 (1874); Id., Mél. orthopt., ii, 231-33, 451 (1877); Brunner, Mitth. schweiz. ent. gesellsch., iv, 166 (1877).

*Nemobius*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 382 (1874); Id., Mél. orthopt., ii, 240-42 (1877); Scudder, Journ. N. Y. ent. soc., iv, 100-101 (1896); Id., Psyche, vii, 431-33 (1896).

*Gryllus*.—(Tables of species) de Haan, Bijdr. kenn. Orthopt., 229-30 (1842); Saussure, Miss. scient. Mex., Orthopt., 395-96 (1874); Id., Mél. orthopt., ii, 314-16 (1877).

*Gryllodes*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 410-11 (1874); Id., Mél. orthopt., ii, 367-68 (1877).

OECANTHINAE.—(Tables of genera) Saussure, Miss. scient. Mex., Orthopt., 429-30 (1874); Brunner, Mitth. schweiz. ent. gesellsch., iv, 454-55 (1877); Saussure, Mél. orthopt., ii, 536-39 (1878).

*Oecanthus*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 458 (1874); Id., Mél. orthopt., ii, 593 (1878). (Distinctions between N. A. species) Hart, Ent. news, iii, 33-34 (1892).

TRIGONIDINAE.—(Tables of genera) Saussure, Miss. scient. Mex., Orthopt., 363 (1874); Brunner, Mitth. schweiz. ent. gesellsch., iv, 455-56 (1877); Saussure, Mél. orthopt., ii, 601-602 (1878); Brunner, Rév. syst. Orthopt., 207 (1893).

*Anaxiphus*.—(Table of species) Saussure, Miss. scient. Mex., Orthopt., 371 (1874).

*Cyrtoxiphus*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 373 (1874); Id., Mél. orthopt., ii, 618 (1878).

*Phylloscirtus*.—(Tables of species) Gerstaecker, Stett. ent. zeit., xxiv, 425-26 (1863); Saussure, Miss. scient. Mex., Orthopt.,

365 (1874); Id., Mél. orthopt., ii, 635-36 (1878); Burmeister, Cephal. n. Phyllosc. 15-16 (1880).

ENEOPTERINAE.—(Tables of genera) Saussure, Miss. scient. Mex., Orthopt., 465-66 (1874); Brunner, Mitth. schweiz. ent. gesellsch., iv, 455 (1877); Saussure, Mél. orthopt., ii, 645-49 (1878).

*Paroecanthus*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 470 (1874); Id., Mél. orthopt., ii, 735 (1878).

*Apithis*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 488 (1874); Id., Mél. orthopt., ii, 744-45 (1878).

*Orocharis*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 494 (1874); Id., Mél. orthopt., ii, 751 (1878).

*Metrypa*.—(Tables of species) Saussure, Miss. scient. Mex., Orthopt., 513 (1874); Id., Mél. orthopt., ii, 812-13 (1878).

Other tables of genera and higher groups of Gryllidae will doubtless appear in Saussure's treatment of the family in the *Biologia centrali-americana*, now in the course of publication.

## LIST OF THE LITERATURE

REFERRED TO IN THE PRECEDING BIBLIOGRAPHICAL NOTES.

*Bolivar*, Ignacio. *Analecta orthopterologica*. 48 pp., 2 pl. [Madrid], 1878. 8°. (Anal. soc. espan. hist. nat., vii, 423-470, pl. 4-5.)

— *Essai sur les Acridiens de la tribu des Tettigidae*. 2 + 139 pp., 2 pl. Gand, 1887. 8°. (Ann. soc. ent. Belg. xxxi, 175-313, pl. 1-2.)

*Bormans*, August. *Étude sur quelques Forficulaires nouveaux ou peu connus, précédée d'un tableau synoptique des genres de cette famille*. 36 pp., 1 pl., 1 sheet. Bruxelles, 1883. 8°. (Ann. soc. ent. Belg., xxvii, 59-90, pl. 2.)

— *Dermaptera*. Godm.-Salv., Biol. centr. amer., Orthopt., 1-12, pl. 1-2. London, 1893. 4°.

*Brunner von Wattenwyl*, Carl. *Nouveau système des Blattaires*. 426 pp., 13 pl. Vienne, 1865. 8°.

— *Système des Gryllides*. 8 pp. [Schaffhausen], 1877. 8°. (Mitth. schweiz. ent. gesellsch., iv, 163-170.)

— *Monographie der Phaneropteriden*. 2 + 401 pp., 8 pl. Wien, 1878.

8°. — *Additamenta zur monographie der Phaneropteriden*. 196 pp., 2 pl. Wien, 1891. 8°. (Verh. zool.-bot. gesellsch. Wien, xli, 1-196, pl. 1-2.)

— *Prodromus der europäischen Orthopteren*. 32 + 466 pp., 12 pl. Leipzig, 1882. 8°.

— *Monographie der Stenopelmatiden und Gryllacriden*. 150 pp., 4 pl. Wien, 1888. 8°. (Verh. zool.-bot. gesellsch. Wien, xxxviii, 247-394, pl. 5-8.)

— *Révision du système des Orthoptères, et description des espèces rapportées par M. Leonardo Fea de Birmanie*. 230 pp., 6 pl. Genova, 1893. 8°. (Ann. mus. civ. stor. nat. Genova, (2), xiii, 1-230, pl. 1-6.)

*Monographie der Pseudophylliden*. 4 + 282 pp., 10 pl. Wien, 1895. Text 8°, plates 4°.

*Burmeister*, Hermann Carl Conrad. *Handbuch der entomologie*. Bd. II, abth. ii. 666 pp. Berlin, 1838. 8°.

— *Cephalocaema und Phylloscirtus, zwei merkwürdige Orthopteren-gattungen der fauna argentina*. 20 pp., 1 pl. Halle, 1880. 4°. (Abh. naturf. gesellsch. Halle, xv, 1-20, pl. 1.)

*Comstock*, John Henry. *An introduction to entomology* [Part i]. 4 + 234 pp. Ithaca, 1888. 8°.

— and *Comstock*, Anna Botsford. *A manual for the study of insects*. 12 + 701 pp., 6 pl. Ithaca, 1895. 8°.

*Dohrn*, Wolfgang Ludwig Heinrich. Versuch einer monographie der Dermapteren. Stett. ent. zeit., xxiv-xxviii, passim. Stettin, 1863-67. 8°.

*Fernald*, Charles Henry. The Orthoptera of New England; designed for the use of the students in the Massachusetts agricultural college and the farmers of the state. 61 pp. Boston, 1888. 8°. (Ann. rep. Mass. agric. coll., xxv [Pub. doc. 1888, 31], 89-145; Rep. sec. board agric. Mass., 1887, 421-481.)

*Fieber*, Franz Xavier. Synopsis der europäischen Orthopteren, mit besonderer rücksicht auf die in Böhmen vorkommenden arten. 4 + 79 pp. Prag, 1854 [1853\*]. (Lotos, iii, passim.)

*Finot*, Adrien. Faune de la France. Insectes Orthoptères. Thysanoures et Orthoptères proprement dits. 322 pp., 13 pl. Fontainebleau, 1890. 8°.

*Fischer*, Leopold Heinrich. Orthoptera europaea. 20 + 454 pp., 18 pl. Lipsiae, 1853. 4°.

*Gerstaecker*, Carl Eduard Adolph. Scephastus und Phylloscirtus, zwei kaferähnliche Grylloden-gattungen. Stett. ent. zeit., xxiv, 408-436. Stettin, 1863. 8°.

*Glover*, Townend. Illustrations of North American entomology (United States and Canada). Orthoptera. 5 + 11 pp., 13 pl. Washington, 1872. 4°. Five additional plates, with MS. explanation, were afterward issued, four in 1874, the last still later.

*Haan*, Willem de. Bijdragen tot de kennis der Orthoptera. Temminck, Verh. nat. geschied. Nederl. overz. bezitt., 45-248, pl. 10-23. Leiden, 1842, fol.

*Hart*, Charles A. On the species of *Oecanthus*. Ent. news, iii, 33-34. Philadelphia, 1892. 8°.

*Hermann*, Otto. Die Decticeiden der Brunner von Wattenwyl'schen sammlung; i, genera. Verh. zool.-bot. gesellsch. Wien, xxiv, 191-210 pl. 3-6. Wien, 1874. 8°.

*Kirby*, William Forsell. A revision of the Forficulidae, with descriptions of new species in the British museum. Journ. linn. soc. Lond., zool., xxiii, 502-531, pl. 12. London, 1890. 8°.

*McNeill*, Jerome. Revision of the Truxalinae of North America. Proc. Davenport. acad. nat. sc., vi, 179-274, pl. 1-6. Davenport, 1897. 8°.

*Morse*, Albert Pitts. Notes on the Acrididae of New England. i, Tettiginae; ii, Tryxalinae; iii, Oedipodinae. Psyche vii-viii, passim. Cambridge, 1894-1897. 4°.

— Revision of the species of *Spharagemon*. Psyche, vii, 287-299. Cambridge, 1895. 4°.

\*The date on the title page is 1854, but the whole appeared by instalments in *Lotos* in 1853 — the last, in November, containing the Gryllidae; and Fieber in mentioning this in *Lotos* (iv, 146, note) says of the separate issue "unrichtig mit der jahreszahl 1854." It is important, as it thus precedes Fischer's work, the preface of which is ix., dated, Cal. Nov. MDCCCLIII."



*Pictet*, Alphonse et *Saussure*, Henri de. Catalogue d'Acridiens. 46 pp. Schaffhouse, 1887. 8°. (Bull. soc. ent. suisse, vii, 331-376.)

*Redtenbacher*, Josef. Monographie der Conocephaliden. Verh. zool.-bot. gesellsch. Wien, xli, 315-562, pl. 3-4. Wien, 1891. 8°.

*Saussure*, Henri de. Mélanges orthoptérologiques. Tomes i-ii. Genève. 4°. T. i, 460 pp., 7 pl., 1863-71. T. ii, 834 pp., 19 pl., 1872-1878. (Extr. Mém. soc. phys. hist. nat. Genève, xvii-xxv.)

— Orthoptères de l'Amérique moyenne. 279 pp., 2 pl. Genève, 1864. 4°. (Sauss., Mém. hist. nat. Mex., I, iii-iv.)

— Synopsis des Mantides américains. 184 pp., 2 pl. Genève, 1871. 4°. (Sauss., Mém. hist. nat. Mex., II, i.)

— Essai d'un système des Mantides. Mitth. schweiz. ent. gesellsch., iii, 49-73. Schaffhausen, 1872. 8°.

— Additions au système des Mantides. Mitth. schweiz. ent. gesellsch., iii, 221-244. Schaffhausen, 1872. 8°.

— Études sur les insectes Orthoptères. 6 + 533 pp., 8 pl. Paris, 1872 [1872-79]. fol. (Miss. scient. Mex. et Amér. centr., Rech. zool.)

— Prodromus Oedipodiorum, insectorum ex ordine Orthopterorum. 256 pp., 1 pl. Genève, 1884. 4°. (Mém. soc. phys. hist. nat. Genève, xxviii, No. 9.)—Additamenta ad prodromum Oedipodiorum. 182 pp., 1 pl. Genève, 1888. 4°. (Mém. soc. phys. hist. nat. Genève, xxx, No 1.) These two were subsequently connected, with a new title page: Prodrome des Oedipodiens, insectes de l'ordre des Orthoptères. Genève, 1888. 4°.

— Révision de la tribu des Panesthiens et de celle des Epilampriens, insectes Orthoptères de la famille des Blattides. Rev. suisse zool., iii, 299-364, pl. 9. Genève, 1895. 8°.

— Révision du genre Tridactylus. Rev. suisse zool., iv, 407-419, Genève, 1897. 8°.

— Orthoptera genuina: Gryllidae. Godm.-Salv., Biol. centr. Amer., Orthopt., 198- pl. 11- London, 1894. 4°. (In course of publication.)

— et *Zehntner*, Leo. Orthoptera genuina: Blattidae, Mantidae. Godm.-Salv., Biol. centr. amer., Orthopt., 13-197, pl. 1-10. London, 1893-94. 4°.

*Scudder*, Samuel Hubbard. Materials for a monograph of the North American Orthoptera, including a catalogue of the known New England species. Bost. journ. nat. hist., vii, 409-480. Boston, 1862. 8°.

— Catalogue of the Orthoptera of North America, described previous to 1867. 20 + 89 pp. Washington, 1868. 8°.

— Revision of the large, stylated, fossorial crickets. 28 pp., 1 pl. Salem, 1869. 8°. (Mem. Peab. acad. sc., i.)

— Spharagemon, a genus of Oedipodidae, with a revision of the species. Proc. Bost. soc. nat. hist., xvii, 467-471; Ent. notes, iv, 66-70. Boston, 1875. 8°.

— Revision of two American genera of Oedipodidae. Proc. Bost. soc., nat. hist., xvii, 478-485; Ent. notes, iv, 77-84. Boston, 1875. 8°.

*Scudder*, Samuel Hubbard. Brief synopsis of North American earwigs, with an appendix on the fossil species. Bull. U. S. geol. surv. terr., ii, 249-260. Washington, 1876. 8°.

— Synoptical tables for determining North American insects. Orthoptera. *Psyche*, i, 169-171. Cambridge, 1876. 8°.

— Synoptical tables for determining North American insects. Orthoptera — U. S. Forficulariae. *Psyche*, i, 177-178. Cambridge, 1876. 8°.

— Critical and historical notes on Forficulariae; including descriptions of new generic forms and an alphabetical synonymic list of the described species. Proc. Bost. soc. nat. hist., xviii, 287-332; Ent. notes, v, 27-72. Boston, 1876. 8°.

— Report on the Orthoptera collected by the U. S. geographical surveys west of the 100th meridian, under the direction of Lt. George M. Wheeler, during the season of 1875. Rep. chief eng., 1876, 498-515. Washington, 1877. 8°.

— Remarks on Calliptenus and Melanoplus, with a notice of the species found in New England. Proc. Bost. soc. nat. hist., xix, 281-286; Ent. notes, vi, 40-45. Boston, 1878. 8°.

— Brief notice of the American species of Melanoplus found west of the one hundred and seventeenth meridian. Proc. Bost. soc. nat. hist., xix, 286-290; Ent. notes, vi, 45-49. Boston, 1878. 8°.

— Some genera of Oedipodidae rescued from the Tryxalidae. *Psyche*, v, 431-442. Cambridge, 1890. 4°.

— The Orthopteran genus *Hippiscus*. *Psyche* vi, passim. Cambridge, 1892. 4°.

— A preliminary view of the North American Decticinae. Can. ent., xxvi, 177-184. London, 1894. 8°.

— The North American Ceuthophili. Proc. Amer. acad. arts sc., xxx, 17-113. Boston, 1894. 8°.

— Summary of the U. S. Phasmidae. Can. ent., xxvii, 29-30. London, 1895. 8°.

— The New England Melanopli. *Psyche*, vii, 367-370. Cambridge, 1896. 4°.

— The North American species of *Nemobius*. Journ. N. Y. ent. soc., iv, 99-107. New York, 1896. 8°.

— The species of *Nemobius* found in North America. *Psyche*, vii, 431-434. Cambridge, 1896. 4°.

— Index to the Mantidae of North America north of Mexico. Can. ent., xxviii, 207-215. London, 1896. 8°.

— The genera of North America Melanopli. Proc. amer. acad. arts sc., xxxii, 192-206. Boston, 1897. 8°.

— Synonymical and descriptive notes on North American Orthoptera. Can. ent., xxix, 73-76. London, 1897. 8°.

— The species of the genus *Melanoplus*. Proc. amer. phil. soc., xxxvi. Philadelphia, 1897. 8°.

*Serville*, Jean Guillaume Audinet. Revue méthodique des insectes de l'ordre des Orthoptères. 101 pp. Paris, 1831. 8°. (Ann. sc. nat., xxii, passim).

— Histoire naturelle des insectes. Orthoptères. 18 + 777 pp., 14 pl. Paris, 1839. 8°.

*Sharp*, David. Insecta. Cambr. nat. hist., v, 81–584. London, 1895. 8°.

*Stål*, Carl. Recensio Orthopterorum. Revue critique des Orthoptères décrits par Linné, de Geer et Thunberg. [3 parts.] Stockholm. 8°. i, 4 + 154 pp., 1873; ii, 4 + 121 pp., 1874; iii, 4 + 105 pp., 1875.

— Recherches sur le système des Mantides. 26 pp. Stockholm, 1873. 8°. (Bih. svensk. vet. akad. handl., i, no. 10.)

— Orthoptera nova. Öfv. vet. akad. förh., xxx, 39–53. Stockholm, 1873. 8°.

— Recherches sur le système des Blattaires. 18 pp. Stockholm, 1874. 8°. (Bih. svensk. vet. akad. handl., ii, no. 13.)

— Recherches sur le système des Phasmides. 19 pp. Stockholm, 1875. 8°. (Bih. svensk. vet. akad. handl., ii, no. 17.)

— Observations orthoptérologiques. [i], 43 pp. Stockholm, 1875. 8°. (Bih. svensk. vet. akad. handl., iii, no. 14.); ii, 58 pp. 1876 (Bih., iv, no. 5.); iii, 20 pp. 1878 (Bih., v, no. 9.).

— Systema Mantodeorum. Essai d'une systématization nouvelle des Mantodées. 91 pp., 1 pl. Stockholm, 1877. 8°. (Bih. svensk. vet. akad. handl., iv, no. 10).

— Systema Acrideodeorum. Essai d'une systématization des Acridiodées, i. 100 pp. Stockholm, 1878. 8°. (Bih. svensk. vet. akad. handl., v, no. 4).

*Thomas*, Cyrus. Notes on the saltatorial Orthoptera of the Rocky Mountain regions. Ann. rep. U. S. geol. surv. terr., v, 423–466, pl. 1–2. Washington. 1872. 8°.

— Synopsis of the Acrididae of North America. 10 + 262 pp., 1 pl. Washington, 1873. 4°. (Rep. U. S. geol. surv. terr., v.)

— Key to Illinois Orthoptera. 4 pp. [Carbondale, 1875.?). 8°.

— The Acrididae of Illinois. Rep. ins. Ill., ix, 73–140. Springfield, 1880. 8°.

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# CORRECTIONS.

## PAGE

- 30, line 1, read : Tempora elongate.  
 42, line 13, for *c* read : *c*<sup>2</sup>.  
 45, last line but 3, read : (*A*<sup>2</sup> *b*<sup>2</sup> *c*<sup>2</sup> *d*<sup>3</sup>).  
 84, last line of note, read : dated, ix. Cal. Nov. MDCCCLIII.













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